ORIGINAL

BE-20101110

TO ANN G.

LAW OFFICES

MILLER AND NEELY, P. C.

SUITE 704

6900 WISCONSIN AVENUE

BETHESDA, MD 20815

(301) 986-4160

FAX: (301) 986-4162

JERROLD D. MILLER

JOHN S. NEELY*

*ADMITTED PA AND DC ONLY

November 10, 2010

Secretary
Federal Communications Commission
Washington, DC 20554

MAILED
NOV 15 2010
FCC Mail Room

ATTN: Audio Division (AM)

RE: Form 302-AM
(Direct Measurement of Power)
KLVZ(AM) Brighton, Colorado
FAC: 35089

Dear Madam Secretary:

Transmitted herewith in triplicate on behalf of KLZ Radio, Inc., licensee of the above-referenced station is FCC Form 302-AM, an application for Direct Measurement of Power.

No filing fee is required with this application. Any questions concerning this matter should be addressed to the undersigned.

Sincerely,

John S. Neely

encs.

Federal Communications Commission
Washington, D. C. 20554

Approved by OMB
3060-0627
Expires 01/31/98

FOR FCC USE ONLY

FCC 302-AM
APPLICATION FOR AM BROADCAST STATION LICENSE

(Please read instructions before filling out form.

FOR COMMISSION USE ONLY
FILE NO. BZ-20101101AEF
BNML-

SECTION I - APPLICANT FEE INFORMATION

1. PAYOR NAME (Last, First, Middle Initial)

KLZ Radio, Inc. (FRN 0003-2524-59)

Copy notices and communications to:

MAILING ADDRESS (Line 1) (Maximum 35 characters)
P.O. Box 3003

Miller and Neely, PC
6900 Wisconsin Ave., Suite 704

MAILING ADDRESS (Line 2) (Maximum 35 characters)

Bethesda, MD 20815

CITY	STATE OR COUNTRY (if foreign address)	ZIP CODE
Blue Bell	PA	19422

TELEPHONE NUMBER (include area code)	CALL LETTERS	OTHER FCC IDENTIFIER (If applicable)
(215) 628-3500	KLVZ	

2. A. Is a fee submitted with this application? FACID 35089 ☐ Yes ☑ No

B. If No, indicate reason for fee exemption (see 47 C.F.R. Section

☐ Governmental Entity ☐ Noncommercial educational licensee ☑ Other (Please explain):

C. If Yes, provide the following information:

Enter in Column (A) the correct Fee Type Code for the service you are applying for. Fee Type Codes may be found in the "Mass Media Services Fee Filing Guide." Column (B) lists the Fee Multiple applicable for this application. Enter fee amount due in Column (C).

(A) FEE TYPE CODE	(B) FEE MULTIPLE	(C) FEE DUE FOR FEE TYPE CODE IN COLUMN (A)	FOR FCC USE ONLY
	0001	$	

To be used only when you are requesting concurrent actions which result in a requirement to list more than one Fee Type Code.

(A)	(B)	(C)	FOR FCC USE ONLY
	0001	$	

ADD ALL AMOUNTS SHOWN IN COLUMN C, AND ENTER THE TOTAL HERE. THIS AMOUNT SHOULD EQUAL YOUR ENCLOSED REMITTANCE.	TOTAL AMOUNT REMITTED WITH THIS APPLICATION	FOR FCC USE ONLY
	$	

2 00709/2AAC
0003252459

SECTION II - APPLICANT INFORMATION		
1. NAME OF APPLICANT KLZ Radio, Inc. FRN: 0003-2524-59		
MAILING ADDRESS P.O. Box 3003		
CITY Blue Bell	STATE PA	ZIP CODE 19422

2. This application is for:

☑ Commercial ☐ Noncommercial

☑ AM Directional ☐ AM Non-Directional

Call letters FAC 35089 KLVZ	Community of License Brighton, CO	Construction Permit File No. N/A	Modification of Construction Permit File No(s). N/A	Expiration Date of Last Construction Permit N/A

3. Is the station now operating pursuant to automatic program test authority in accordance with 47 C.F.R. Section 73.1620?

☐ Yes ☑ No

If No, explain in an Exhibit.

Exhibit No. N/A

4. Have all the terms, conditions, and obligations set forth in the above described construction permit been fully met?

☐ Yes ☐ No

If No, state exceptions in an Exhibit.

Exhibit No. N/A

5. Apart from the changes already reported, has any cause or circumstance arisen since the grant of the underlying construction permit which would result in any statement or representation contained in the construction permit application to be now incorrect?

☐ Yes ☐ No

If Yes, explain in an Exhibit.

Exhibit No. N/A

6. Has the permittee filed its Ownership Report (FCC Form 323) or ownership certification in accordance with 47 C.F.R. Section 73.3615(b)?

☐ Yes ☐ No

☑ Does not apply

If No, explain in an Exhibit.

Exhibit No. N/A

7. Has an adverse finding been made or an adverse final action been taken by any court or administrative body with respect to the applicant or parties to the application in a civil or criminal proceeding, brought under the provisions of any law relating to the following: any felony; mass media related antitrust or unfair competition; fraudulent statements to another governmental unit; or discrimination?

☐ Yes ☑ No

If the answer is Yes, attach as an Exhibit a full disclosure of the persons and matters involved, including an identification of the court or administrative body and the proceeding (by dates and file numbers), and the disposition of the litigation. Where the requisite information has been earlier disclosed in connection with another application or as required by 47 U.S.C. Section 1.65(c), the applicant need only provide: (i) an identification of that previous submission by reference to the file number in the case of an application, the call letters of the station regarding which the application or Section 1.65 information was filed, and the date of filing; and (ii) the disposition of the previously reported matter.

Exhibit No. N/A

8. Does the applicant, or any party to the application, have a petition on file to migrate to the expanded band (1605-1705 kHz) or a permit or license either in the existing band or expanded band that is held in combination (pursuant to the 5 year holding period allowed) with the AM facility proposed to be modified herein?

☐ Yes ☑ No

If Yes, provide particulars as an Exhibit.

Exhibit No. N/A

The APPLICANT hereby waives any claim to the use of any particular frequency or of the electromagnetic spectrum as against the regulatory power of the United States because use of the same, whether by license or otherwise, and requests and authorization in accordance with this application. (See Section 304 of the Communications Act of 1934, as amended).

The APPLICANT acknowledges that all the statements made in this application and attached exhibits are considered material representations and that all the exhibits are a material part hereof and are incorporated herein as set out in full in

CERTIFICATION

1. By checking Yes, the applicant certifies, that, in the case of an individual applicant, he or she is not subject to a denial of federal benefits that includes FCC benefits pursuant to Section 5301 of the Anti-Drug Abuse Act of 1988, 21 U.S.C. Section 862, or, in the case of a non-individual applicant (e.g., corporation, partnership or other unincorporated association), no party to the application is subject to a denial of federal benefits that includes FCC benefits pursuant to that section. For the definition of a "party" for these purposes, see 47 C.F.R. Section 1.2002(b).

☑ Yes ☐ No

2. I certify that the statements in this application are true, complete, and correct to the best of my knowledge and belief, and are made in good faith.

Name	Signature	
Donald B. Crawford		
Title	Date	Telephone Number
President	11/03/2010	(215) 628-3500

WILLFUL FALSE STATEMENTS ON THIS FORM ARE PUNISHABLE BY FINE AND/OR IMPRISONMENT (U.S. CODE, TITLE 18, SECTION 1001), AND/OR REVOCATION OF ANY STATION LICENSE OR CONSTRUCTION

FCC NOTICE TO INDIVIDUALS REQUIRED BY THE PRIVACY ACT AND THE PAPERWORK REDUCTION ACT

The solicitation of personal information requested in this application is authorized by the Communications Act of 1934, as amended. The Commission will use the information provided in this form to determine whether grant of the application is in the public interest. In reaching that determination, or for law enforcement purposes, it may become necessary to refer personal information contained in this form to another government agency. In addition, all information provided in this form will be available for public inspection. If information requested on the form is not provided, the application may be returned without action having been taken upon it or its processing may be delayed while a request is made to provide the missing information. Your response is required to obtain the requested authorization.

Public reporting burden for this collection of information is estimated to average 639 hours and 53 minutes per response, including the time for reviewing instructions, searching existing data sources, gathering and maintaining the data needed, and completing and reviewing the collection of information. Comments regarding this burden estimate or any other aspect of this collection of information, including suggestions for reducing the burden, can be sent to the Federal Communications Commission, Records Management Branch, Paperwork Reduction Project (3060-0627), Washington, D. C. 20554. Do NOT send completed forms to this address.

THE FOREGOING NOTICE IS REQUIRED BY THE PRIVACY ACT OF 1974, P.L. 93-579, DECEMBER 31, 1974, 5 U.S.C. 552a(e)(3), AND THE PAPERWORK REDUCTION ACT OF 1980, P.L. 96-511, DECEMBER 11, 1980, 44 U.S.C. 3507.

SECTION III - LICENSE APPLICATION ENGINEERING DATA

Name of Applicant
KLZ Radio, Inc.

PURPOSE OF AUTHORIZATION APPLIED FOR: (check one)

☐ Station License ☑ Direct Measurement of Power

1. Facilities authorized in construction permit					
Call Sign	File No. of Construction Permit (if applicable)	Frequency (kHz)	Hours of Operation	Power in kilowatts	
				Night	Day
KLVZ	N/A	810	Unlimited	0.43	2.2

2. Station location	
State	City or Town
Colorado	Brighton

3. Transmitter location			
State	County	City or Town	Street address (or other identification)
CO	Weld	Brighton	12348 Weld Co. Rd. 6

4. Main studio location			
State	County	City or Town	Street address (or other identification)
CO	Denver	Denver	2150 W. 29th Ave.

5. Remote control point location (specify only if authorized directional antenna)			
State	County	City or Town	Street address (or other identification)
CO	Denver	Denver	2150 W. 29th Ave.

6. Has type-approved stereo generating equipment been installed? ☐ Yes ☑ No

7. Does the sampling system meet the requirements of 47 C.F.R. Section 73.68? ☑ Yes ☐ No ☐ Not Applicable

Attach as an Exhibit a detailed description of the sampling system as installed. Exhibit No. E-1

8. Operating constants:	
RF common point or antenna current (in amperes) without modulation for night system 3.05	RF common point or antenna current (in amperes) without modulation for day system 6.89
Measured antenna or common point resistance (in ohms) at operating frequency Night 50 Day 50	Measured antenna or common point reactance (in ohms) at operating frequency Night 0 Day 0

Antenna indications for directional operation

Towers	Antenna monitor Phase reading(s) in degrees		Antenna monitor sample current ratio(s)		Antenna base currents	
	Night	Day	Night	Day	Night	Day
1	---	-128.9	---	0.481	---	---
2	---	0.0	---	1.000	---	---
3	---	+123.5	---	0.514	---	---

Manufacturer and type of antenna monitor: Potomac Instruments Type 1901

SECTION III - Page 2

9. Description of antenna system ((f directional antenna is used, the information requested below should be given for each element of the array. Use separate sheets if necessary.)

Type Radiator	Overall height in meters of radiator above base insulator, or above base, if grounded.	Overall height in meters above ground (without obstruction lighting)	Overall height in meters above ground (include obstruction lighting)	If antenna is either top loaded or sectionalized, describe fully in an Exhibit.
On File	No Change	On File	No Change	Exhibit No. N/A

Excitation ☑ Series ☐ Shunt

ASR - 1024154
1024155
1024156

Geographic coordinates to nearest second. For directional antenna give coordinates of center of array. For single vertical radiator give tower location.

North Latitude	West Longitude
40 ° 01 ' 41 "	104 ° 49 ' 21 "

If not fully described above, attach as an Exhibit further details and dimensions including any other antenna mounted on tower and associated isolation circuits. Exhibit No. N/A

Also, if necessary for a complete description, attach as an Exhibit a sketch of the details and dimensions of ground system. Exhibit No. On File

10. In what respect, if any, does the apparatus constructed differ from that described in the application for construction permit or in the permit?

N/A

11. Give reasons for the change in antenna or common point resistance.

No change in common point resistance. Moment method daytime partial proof only following installation of microwave antenna on tower 1 of the array.

I certify that I represent the applicant in the capacity indicated below and that I have examined the foregoing statement of technical information and that it is true to the best of my knowledge and belief.

Name (Please Print or Type)	Signature (check appropriate box below)
W.C. Alexander	
Address (include ZIP Code)	Date
2821 S. Parker Road Suite 1205 Aurora, CO 80014-2708	11/03/2010
	Telephone No. (Include Area Code) (303) 433-0104

☑ Technical Director ☐ Registered Professional Engineer

☐ Chief Operator ☐ Technical Consultant

☐ Other (specify)

EXHIBIT E-1

APPLICATION FOR MODIFICATION OF STATION LICENSE
RADIO STATION KLVZ
BRIGHTON, COLORADO

KLZ Radio, Inc.

November 3, 2010

810 kHz 2.2 kW-D/0.43 kW-N DA-2

EXECUTIVE SUMMARY

This engineering exhibit supports an application for modification of station license for the existing daytime directional antenna system of radio station KLVZ in Brighton, Colorado (FCC FID No. 35089). The KLVZ daytime facility is licensed pursuant to the moment-method modeling rules contained in 47 C.F.R. §73.151(c). – BMML-20090603 AHB.

On October 29, 2010 an 11 GHz microwave antenna was added to tower 1 of the KLVZ daytime array for fixed microwave station WQLS409 (File No. 0004257911). This antenna was installed at the 76.2-meter elevation of the tower. Special Temporary Authority (BSTA-20101013AAB) was obtained from the Media Bureau prior to the installation of the antenna to operate with parameters at variance pending measurement of the base impedance of tower 1.

The base impedance was measured after the installation of the antenna and was found to differ from the value measured on May 6, 2009 when the array was originally modeled.

Information is provided herein showing the new tower 1 impedance value, the new tower 1 calibration and circuit models and the new directional antenna model incorporating the model changes at tower 1. No changes have been made to the sampling system or any other component of the array. A modified station license is requested herewith specifying the new daytime operating parameters.

Analysis of Tower 1 Impedance Measurements to Verify Method of Moments Model

A tower base impedance measurement was made at the final J-plug within the tower 1 Antenna Tuning Unit (ATU) using a General Radio 1606B impedance bridge. The other towers were all open-circuited at the same points where the impedance measurements were made for them. This arrangement left only the short feed tubing between the ATU output and the tower base in series in the impedance measurement.

ACSModel (MININEC 3.1 core) was used to model the KLVZ daytime array.

A lumped load with a reactance of $-j10{,}000$ was modeled at the base of the other towers to simulate an open circuit at each tower base.

The modeled tower heights of the towers were not adjusted from the original model. As such, all modeled tower heights remain within 75 to 125 percent of the physical tower height as required by the FCC Rules.

The modeled radii for tower 2 and 3 and for the first 19 segments of tower 1 were not changed from the original model and remain as the physical radius of the towers as determined by the formula $3T/2\pi$, where T is the tower face width in meters. The KLVZ radiators are uniform cross-section triangular towers and have face widths of 0.6097 meters. Except for the top segment of tower 1, each tower's radius was modeled at 0.2911 meters.

The radius of the top segment of tower 1 was increased to 0.4500 meters to account for the added aperture at this level produced by the addition of the 11 GHz microwave antenna.

The circuit models for towers 2 and 3 were unchanged from the original models submitted with the prior license application. The circuit model for tower 1 was changed only to reflect the new modeled base impedance. This model was used with the Westberg Circuit Analysis Program (WCAP) to determine the effects of the base region reactances on the ATU output impedance tower 1. In the tower 1 WCAP tabulation, node 2 represents the ATU output reference point and node 3 represents the tower base. Node 0 represents ground potential. The ATU output impedance can be found in the "TO NODE IMPEDANCE" column of the WCAP tabulation, following the phantom 1.0 ohm resistor inserted in the model to provide a calculation point for the impedance. The complex base impedance of tower 1 from the moment method model is represented by the complex load from node 3 to ground. A value of 80 pF was assumed for the base insulator, and this appears in the WCAP tabulation from node 3 to ground as 0.001 (microfarads) due to rounding. The WCAP circuit model tabulation immediately follows the model for tower 1.

The modeled and measured impedance at the tower 1 ATU output J-plug with the other towers open-circuited at their ATU output J-plugs agree within ± 2 ohms and ± 4 percent as required by the FCC rules.

Table 1 – Analysis of Tower Impedance Measurements to Verify Moment Method Model

Twr.	Z_{BASE} (Modeled)	Z_{ATU} (Modeled)	Z_{ATU} (Measured)	Series L (uH)	Shunt C pF	Phys. Height (deg.)	Model Height (deg.)	% Phys. Height
1	30.7 –j19.0	30.1 +j11.1	30.0 +j11.1	5.96	80	77.0	81.575	105.9
2	29.6 –j21.3	29.1 +j6.1	29.0 +j6.1	5.41	80	77.0	82.290	106.9
3	32.4 –j11.6	32.1 –j3.7	32.0 –j3.7	1.62	80	77.0	83.920	109.0

```
****************************************
                ACSModel
          (MININEC 3.1 Core)
      11-03-2010          08:14:58
****************************************

KLVZ-1M
3-Tower Daytime Array
Tower 1 Driven, 2 & 3 Floated

Frequency = 0.810 MHz     Wavelength = 370.12346 Meters

No. of Wires: 4

Wire No. 1   Coordinates                                  End          No. of
   X             Y             Z          Radius     Connection
Segments
-59.77779     -50.15952      0                          -1
-59.77779     -50.15952      79.67627      0.2911        0              19

Wire No. 2   Coordinates                                  End          No. of
   X             Y             Z          Radius     Connection
Segments
-59.77779     -50.15952      79.67627                    1
-59.77779     -50.15952      83.86895      0.475         0               1

Wire No. 3   Coordinates                                  End          No. of
   X             Y             Z          Radius     Connection
Segments
 0              0             0                          -3
 0              0             84.56293      0.2911        0              20

Wire No. 4   Coordinates                                  End          No. of
   X             Y             Z          Radius     Connection
Segments
 59.77779       50.15952      0                          -4
 59.77779       50.15952      86.27989      0.2911        0              20

                **** ANTENNA GEOMETRY ****

Wire No.  1  Coordinates                                  Connection  Pulse
X             Y             Z             Radius        End1 End2   No.
-59.77779     -50.15952      0             0.2911        -1   1      1
-59.77779     -50.15952      4.193488      0.2911        1    1      2
-59.77779     -50.15952      8.386975      0.2911        1    1      3
-59.77779     -50.15952      12.58046      0.2911        1    1      4
-59.77779     -50.15952      16.77395      0.2911        1    1      5
-59.77779     -50.15952      20.96744      0.2911        1    1      6
-59.77779     -50.15952      25.16093      0.2911        1    1      7
-59.77779     -50.15952      29.35442      0.2911        1    1      8
-59.77779     -50.15952      33.5479       0.2911        1    1      9
-59.77779     -50.15952      37.74139      0.2911        1    1      10
-59.77779     -50.15952      41.93488      0.2911        1    1      11
-59.77779     -50.15952      46.12837      0.2911        1    1      12
-59.77779     -50.15952      50.32185      0.2911        1    1      13
-59.77779     -50.15952      54.51534      0.2911        1    1      14
-59.77779     -50.15952      58.70883      0.2911        1    1      15
-59.77779     -50.15952      62.90232      0.2911        1    1      16
-59.77779     -50.15952      67.0958       0.2911        1    1      17
-59.77779     -50.15952      71.28929      0.2911        1    1      18
```

-59.77779	-50.15952	75.48278	0.2911	1	0	19

Wire No. 2 Coordinates

X	Y	Z	Radius	Connection End1	End2	Pulse No.
-59.77779	-50.15952	79.67627	0.475	1	0	20

Wire No. 3 Coordinates

X	Y	Z	Radius	Connection End1	End2	Pulse No.
0	0	0	0.2911	-3	3	21
0	0	4.228147	0.2911	3	3	22
0	0	8.456293	0.2911	3	3	23
0	0	12.68444	0.2911	3	3	24
0	0	16.91259	0.2911	3	3	25
0	0	21.14073	0.2911	3	3	26
0	0	25.36888	0.2911	3	3	27
0	0	29.59702	0.2911	3	3	28
0	0	33.82517	0.2911	3	3	29
0	0	38.05332	0.2911	3	3	30
0	0	42.28146	0.2911	3	3	31
0	0	46.50961	0.2911	3	3	32
0	0	50.73775	0.2911	3	3	33
0	0	54.9659	0.2911	3	3	34
0	0	59.19405	0.2911	3	3	35
0	0	63.42219	0.2911	3	3	36
0	0	67.65034	0.2911	3	3	37
0	0	71.87849	0.2911	3	3	38
0	0	76.10664	0.2911	3	3	39
0	0	80.33478	0.2911	3	0	40

Wire No. 4 Coordinates

X	Y	Z	Radius	Connection End1	End2	Pulse No.
59.77779	50.15952	0	0.2911	-4	4	41
59.77779	50.15952	4.313994	0.2911	4	4	42
59.77779	50.15952	8.627989	0.2911	4	4	43
59.77779	50.15952	12.94198	0.2911	4	4	44
59.77779	50.15952	17.25598	0.2911	4	4	45
59.77779	50.15952	21.56997	0.2911	4	4	46
59.77779	50.15952	25.88397	0.2911	4	4	47
59.77779	50.15952	30.19796	0.2911	4	4	48
59.77779	50.15952	34.51196	0.2911	4	4	49
59.77779	50.15952	38.82595	0.2911	4	4	50
59.77779	50.15952	43.13995	0.2911	4	4	51
59.77779	50.15952	47.45394	0.2911	4	4	52
59.77779	50.15952	51.76793	0.2911	4	4	53
59.77779	50.15952	56.08193	0.2911	4	4	54
59.77779	50.15952	60.39592	0.2911	4	4	55
59.77779	50.15952	64.70992	0.2911	4	4	56
59.77779	50.15952	69.02391	0.2911	4	4	57
59.77779	50.15952	73.33791	0.2911	4	4	58
59.77779	50.15952	77.6519	0.2911	4	4	59
59.77779	50.15952	81.9659	0.2911	4	0	60

Sources: 1
Pulse No., Voltage Magnitude, Phase (Degrees): 1, 1.0, 0.0

Number of Loads: 2
Pulse No., Resistance, Reactance: 21 , 0 ,-10000
Pulse No., Resistance, Reactance: 41 , 0 ,-10000

```
********************    SOURCE DATA     ********************
Pulse  1       Voltage = (1.0, 0.0j)
               Current = (0.0236, 0.0146j)
               Impedance = (30.661, -19.007j)
               Power = 0.011780 Watts


********************    CURRENT DATA    ********************
```

Wire No. 1 :

Pulse No.	Real (Amps)	Imaginary (Amps)	Magnitude (Amps)	Phase (Degrees)
1	0.0236	0.0146	0.0277	31.7957
2	0.0235	0.0141	0.0274	30.9515
3	0.0233	0.0137	0.027	30.4155
4	0.023	0.0133	0.0265	29.9602
5	0.0226	0.0128	0.0259	29.5564
6	0.022	0.0123	0.0252	29.1897
7	0.0213	0.0117	0.0243	28.852
8	0.0205	0.0112	0.0234	28.5377
9	0.0196	0.0105	0.0223	28.2431
10	0.0186	0.0099	0.0211	27.9652
11	0.0175	0.0092	0.0197	27.7017
12	0.0162	0.0084	0.0183	27.4507
13	0.0149	0.0077	0.0168	27.2107
14	0.0135	0.0069	0.0151	26.9802
15	0.012	0.006	0.0134	26.7583
16	0.0104	0.0052	0.0116	26.544
17	0.0087	0.0043	0.0097	26.3364
18	0.0069	0.0034	0.0077	26.1352
19	0.0051	0.0025	0.0056	25.9409
J	0.0031	0.0015	0.0035	25.7586

Wire No. 2 :

Pulse No.	Real (Amps)	Imaginary (Amps)	Magnitude (Amps)	Phase (Degrees)
J	0.0031	0.0015	0.0035	25.7586
E	0.0	0.0	0.0	0.0

Wire No. 3 :

Pulse No.	Real (Amps)	Imaginary (Amps)	Magnitude (Amps)	Phase (Degrees)
21	0.0	-0.0001	0.0001	-88.9144
22	0.0	-0.0004	0.0004	-88.8289
23	0.0	-0.0005	0.0005	-88.6888
24	0.0	-0.0007	0.0007	-88.5196
25	0.0	-0.0008	0.0008	-88.3272
26	0.0	-0.0009	0.0009	-88.1147
27	0.0	-0.001	0.001	-87.8842
28	0.0	-0.001	0.001	-87.6373
29	0.0	-0.001	0.001	-87.3751
30	0.0001	-0.0011	0.0011	-87.0992
31	0.0001	-0.001	0.001	-86.8105
32	0.0001	-0.001	0.001	-86.5106
33	0.0001	-0.001	0.001	-86.2006
34	0.0001	-0.0009	0.0009	-85.882
35	0.0001	-0.0008	0.0008	-85.5563
36	0.0001	-0.0008	0.0008	-85.225
37	0.0001	-0.0006	0.0006	-84.8896
38	0.0	-0.0005	0.0005	-84.5516

39	0.0	-0.0004	0.0004	-84.2118
40	0.0	-0.0002	0.0002	-83.8672
E	0.0	0.0	0.0	0.0

Wire No. 4 :

Pulse No.	Real (Amps)	Imaginary (Amps)	Magnitude (Amps)	Phase (Degrees)
41	0.0	0.0	0.0	-154.5193
42	-0.0002	-0.0001	0.0003	-154.539
43	-0.0004	-0.0002	0.0004	-154.571
44	-0.0005	-0.0002	0.0005	-154.6095
45	-0.0005	-0.0003	0.0006	-154.6529
46	-0.0006	-0.0003	0.0007	-154.7006
47	-0.0007	-0.0003	0.0007	-154.7519
48	-0.0007	-0.0003	0.0008	-154.8066
49	-0.0007	-0.0003	0.0008	-154.8643
50	-0.0007	-0.0003	0.0008	-154.9248
51	-0.0007	-0.0003	0.0008	-154.9881
52	-0.0007	-0.0003	0.0008	-155.054
53	-0.0007	-0.0003	0.0008	-155.1225
54	-0.0006	-0.0003	0.0007	-155.1937
55	-0.0006	-0.0003	0.0007	-155.2676
56	-0.0005	-0.0002	0.0006	-155.3446
57	-0.0005	-0.0002	0.0005	-155.4247
58	-0.0004	-0.0002	0.0004	-155.5084
59	-0.0003	-0.0001	0.0003	-155.5965
60	-0.0002	-0.0001	0.0002	-155.6906
E	0.0	0.0	0.0	0.0

WESTBERG CIRCUIT ANALYSIS PROGRAM

FILE NAME = KLVZ-1M.CIR

I	1.0000	0	1	.0000	.0000	.0000
R	1.0000	1	2	.0000	.0000	.0000
L	5.9600	2	3	.0000	.0000	.0000
C	.0001	3	0	.0000	.0000	.0000
R	30.6600	3	0	-19.0000	.0000	.0000
EX	.0000	0	0	.0000	.0000	.0000

FREQ = .810

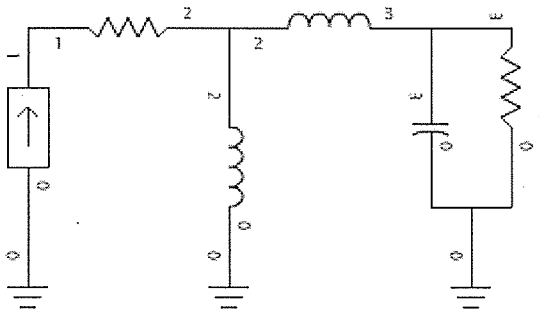
NODE	VOLT MAG	VOLT PHASE
1	33.0396	19.5889
2	32.0993	20.1874
3	35.7552	-32.5841

			BRANCH VOLTAGE		BRANCH CURRENT	FROM NODE IMPEDANCE		TO NODE IMPEDANCE		
			MAG	PHASE	MAG	PHASE	RESISTANCE	REACTANCE	RESISTANCE	REACTANCE	VSWR
R	1-	2	1.000	1.00	.000	1.00	.000	31.13	11.08	30.13	11.08	
L	2-	3	5.960	30.33	90.000	1.00	.000	30.13	11.08	30.13	-19.26	
C	3-	0	.000	35.76	-32.584	.02	57.416	.00	-2183.20	.00	.00	
R	3-	0	30.660	35.76	-32.584	.99	-.798	30.66	-19.00	.00	.00	

Center Frequency: 0.81 MHz

Frequency Range: ±0 kHz

Frequency Step: 0 kHz



WCAP - KLVD-1M

WCAP OUTPUT AT FREQUENCY: 0.810 MHz

NODE VOLTAGES

Node: 1 32.9887 ∠ 20.1206° V

Node: 2 32.0515 ∠ 20.7355° V

Node: 3 35.6649 ∠ -31.9576° V

	WCAP PART		BRANCH VOLTAGE		BRANCH CURRENT	
R	1→2	1.00000000	1.00 ∠	0.000° V	1.00 ∠	0.000° A

L	2→3	5.96000000	30.23 ∠	90.539° V	1.00 ∠	0.539° A
C	3→0	0.00008000	35.66 ∠	-31.958° V	0.01 ∠	58.042° A
R	3→0	30.66000000	35.66 ∠	-31.958° V	0.99 ∠	-0.171° A
L	2→0	628.80000000	32.05 ∠	20.736° V	0.01 ∠	-69.264° A

	WCAP PART		FROM IMPEDANCE		TO IMPEDANCE	
R	1→2	1.00000000	30.98 + j	11.348	29.98 + j	11.348
L	2→3	5.96000000	30.19 + j	11.105	30.19 - j	19.228
C	3→0	0.00008000	0.00 - j	2456.095	0.00 + j	0.000
R	3→0	30.66000000	30.66 - j	19.000	0.00 + j	0.000
L	2→0	628.80000000	0.00 + j	3200.202	0.00 + j	0.000

WCAP INPUT DATA:

	0.8100	0.00000000	0	
I	1.00000000	0	1	0.00000000
R	1.00000000	1	2	0.00000000
L	5.96000000	2	3	0.00000000
C	0.00008000	3	0	
R	30.66000000	3	0	-19.00000000
L	628.80000000	2	0	0.00000000

Derivation of Operating Parameters for Daytime Directional Antenna

Once calibrated against the measured tower 1 open-circuited base impedance, the moment method model was utilized for daytime directional antenna calculations. These calculations were made to determine the complex voltage source values to be applied at ground level for each tower of the array to produce the current moment sums for the towers which, when normalized to the reference tower, equate to the theoretical field parameters of the authorized directional pattern. These voltage sources were then applied in the model and the tower currents were calculated.

Twenty segments were used for each tower. The KLVZ towers are base sampled, which is permitted for towers of 120 electrical degrees or less. As such, the first (ground) segment of each tower was used to determine the model operating parameters of the array.

A circuit model was constructed to determine the effect of the series feed inductance, shunt lighting choke reactance and shunt base region capacitance on the ATU output current. The 3-wire lighting chokes exhibit a manufacturer-specified reactance of +j3,200 at 810 kHz, and the circuit model for each tower is essentially the circuit model used for model verification above with the +j3,200 lighting chokes added in and using the model-predicted operating impedance for each tower. Again, this model was used with the Westberg Circuit Analysis Program (WCAP).

This effect was, as expected, minimal, and the results are tabulated in the table below along with the base operating parameters for the daytime array.

Twr.	Node	Current Magnitude (amperes)	Current Phase (degrees)	WCAP Current Offset for Unity I_{BASE}	WCAP Phase Offset for Unity $\dot{\emptyset}_{BASE}$ (degrees)	Antenna Monitor Ratio	Antenna Monitor Phase (degrees)
1	1	6.7577	-126.9	1.004	+0.07	0.481	-128.9
2	21	13.9545	+1.9	1.010	+0.11	1.000	0.0
3	41	7.1975	125.5	1.006	+0.06	0.514	+123.5

```
****************************************
                ACSModel
            (MININEC 3.1 Core)
        11-03-2010          08:19:41
****************************************

KLVZ-M
3-Tower Daytime Array
Daytime Directional Pattern

Frequency = 0.810 MHz     Wavelength = 370.12346 Meters

No. of Wires: 4

Wire No. 1   Coordinates                                  End          No. of
   X             Y             Z          Radius     Connection
Segments
-59.77779     -50.15952      0                          -1
-59.77779     -50.15952      79.67627      0.2911        0              19

Wire No. 2   Coordinates                                  End          No. of
   X             Y             Z          Radius     Connection
Segments
-59.77779     -50.15952      79.67627                    1
-59.77779     -50.15952      83.86895      0.475         0               1

Wire No. 3   Coordinates                                  End          No. of
   X             Y             Z          Radius     Connection
Segments
 0             0              0                          -3
 0             0              84.60405      0.2911        0              20

Wire No. 4   Coordinates                                  End          No. of
   X             Y             Z          Radius     Connection
Segments
 59.77779      50.15952       0                          -4
 59.77779      50.15952       86.27989      0.2911        0              20

                **** ANTENNA GEOMETRY ****

Wire No.  1  Coordinates                                  Connection  Pulse
X             Y             Z          Radius     End1  End2   No.
-59.77779     -50.15952      0          0.2911     -1    1      1
-59.77779     -50.15952      4.193488   0.2911     1     1      2
-59.77779     -50.15952      8.386975   0.2911     1     1      3
-59.77779     -50.15952      12.58046   0.2911     1     1      4
-59.77779     -50.15952      16.77395   0.2911     1     1      5
-59.77779     -50.15952      20.96744   0.2911     1     1      6
-59.77779     -50.15952      25.16093   0.2911     1     1      7
-59.77779     -50.15952      29.35442   0.2911     1     1      8
-59.77779     -50.15952      33.5479    0.2911     1     1      9
-59.77779     -50.15952      37.74139   0.2911     1     1      10
-59.77779     -50.15952      41.93488   0.2911     1     1      11
-59.77779     -50.15952      46.12837   0.2911     1     1      12
-59.77779     -50.15952      50.32185   0.2911     1     1      13
-59.77779     -50.15952      54.51534   0.2911     1     1      14
-59.77779     -50.15952      58.70883   0.2911     1     1      15
-59.77779     -50.15952      62.90232   0.2911     1     1      16
-59.77779     -50.15952      67.0958    0.2911     1     1      17
-59.77779     -50.15952      71.28929   0.2911     1     1      18
```

-59.77779	-50.15952	75.48278	0.2911	1	0	19

Wire No. 2 Coordinates				Connection		Pulse
X	Y	Z	Radius	End1	End2	No.
-59.77779	-50.15952	79.67627	0.475	1	0	20

Wire No. 3 Coordinates				Connection		Pulse
X	Y	Z	Radius	End1	End2	No.
0	0	0	0.2911	-3	3	21
0	0	4.230203	0.2911	3	3	22
0	0	8.460405	0.2911	3	3	23
0	0	12.69061	0.2911	3	3	24
0	0	16.92081	0.2911	3	3	25
0	0	21.15101	0.2911	3	3	26
0	0	25.38121	0.2911	3	3	27
0	0	29.61142	0.2911	3	3	28
0	0	33.84162	0.2911	3	3	29
0	0	38.07182	0.2911	3	3	30
0	0	42.30202	0.2911	3	3	31
0	0	46.53223	0.2911	3	3	32
0	0	50.76243	0.2911	3	3	33
0	0	54.99263	0.2911	3	3	34
0	0	59.22283	0.2911	3	3	35
0	0	63.45304	0.2911	3	3	36
0	0	67.68324	0.2911	3	3	37
0	0	71.91344	0.2911	3	3	38
0	0	76.14365	0.2911	3	3	39
0	0	80.37385	0.2911	3	0	40

Wire No. 4 Coordinates				Connection		Pulse
X	Y	Z	Radius	End1	End2	No.
59.77779	50.15952	0	0.2911	-4	4	41
59.77779	50.15952	4.313994	0.2911	4	4	42
59.77779	50.15952	8.627989	0.2911	4	4	43
59.77779	50.15952	12.94198	0.2911	4	4	44
59.77779	50.15952	17.25598	0.2911	4	4	45
59.77779	50.15952	21.56997	0.2911	4	4	46
59.77779	50.15952	25.88397	0.2911	4	4	47
59.77779	50.15952	30.19796	0.2911	4	4	48
59.77779	50.15952	34.51196	0.2911	4	4	49
59.77779	50.15952	38.82595	0.2911	4	4	50
59.77779	50.15952	43.13995	0.2911	4	4	51
59.77779	50.15952	47.45394	0.2911	4	4	52
59.77779	50.15952	51.76793	0.2911	4	4	53
59.77779	50.15952	56.08193	0.2911	4	4	54
59.77779	50.15952	60.39592	0.2911	4	4	55
59.77779	50.15952	64.70992	0.2911	4	4	56
59.77779	50.15952	69.02391	0.2911	4	4	57
59.77779	50.15952	73.33791	0.2911	4	4	58
59.77779	50.15952	77.6519	0.2911	4	4	59
59.77779	50.15952	81.9659	0.2911	4	0	60

Sources: 3
Pulse No., Voltage Magnitude, Phase (Degrees): 1, 236.7, -49.5
Pulse No., Voltage Magnitude, Phase (Degrees): 21, 320.4, -33.0
Pulse No., Voltage Magnitude, Phase (Degrees): 41, 208.4, 50.4

Number of Loads: 0

```
********************     SOURCE DATA     ********************
Pulse  1       Voltage = (153.7052, -180.0117j)
               Current = (-4.0587, -5.4031j)
               Impedance = (7.637, 34.185j)
               Power = 174.39 Watts

Pulse  21      Voltage = (268.6583, -174.5435j)
               Current = (13.9467, 0.4659j)
               Impedance = (18.824, -13.144j)
               Power = 1832.79 Watts

Pulse  41      Voltage = (132.8968, 160.4976j)
               Current = (-4.1769, 5.8615j)
               Impedance = (7.444, -27.978j)
               Power = 192.82 Watts

Total Power = 2200.000 Watts

********************     CURRENT DATA     ********************
```

Wire No. 1 :

Pulse No.	Real (Amps)	Imaginary (Amps)	Magnitude (Amps)	Phase (Degrees)
1	-4.0587	-5.4031	6.7577	-126.9133
2	-4.133	-5.4616	6.8492	-127.1166
3	-4.1521	-5.4629	6.8617	-127.2364
4	-4.1388	-5.4268	6.8249	-127.3311
5	-4.0961	-5.3558	6.7426	-127.4087
6	-4.0255	-5.2512	6.6167	-127.4732
7	-3.9281	-5.1141	6.4486	-127.527
8	-3.8046	-4.9454	6.2395	-127.5716
9	-3.656	-4.7459	5.9908	-127.6083
10	-3.483	-4.5167	5.7037	-127.6378
11	-3.2867	-4.2585	5.3794	-127.661
12	-3.068	-3.9726	5.0194	-127.6784
13	-2.8278	-3.6599	4.6251	-127.6907
14	-2.5669	-3.3214	4.1977	-127.6984
15	-2.2864	-2.958	3.7386	-127.7018
16	-1.9868	-2.5704	3.2487	-127.7016
17	-1.6685	-2.159	2.7286	-127.6981
18	-1.3315	-1.7232	2.1777	-127.6918
19	-0.9742	-1.2612	1.5937	-127.6832
J	-0.6021	-0.7798	0.9852	-127.673

Wire No. 2 :

Pulse No.	Real (Amps)	Imaginary (Amps)	Magnitude (Amps)	Phase (Degrees)
J	-0.6021	-0.7798	0.9852	-127.673
E	0.0	0.0	0.0	0.0

Wire No. 3 :

Pulse No.	Real (Amps)	Imaginary (Amps)	Magnitude (Amps)	Phase (Degrees)
21	13.9467	0.4659	13.9545	1.9135
22	13.8251	0.3365	13.8292	1.3941
23	13.6593	0.2541	13.6617	1.0656
24	13.4276	0.1846	13.4289	0.7875
25	13.1282	0.1241	13.1288	0.5416
26	12.7613	0.071	12.7615	0.3188
27	12.3277	0.0245	12.3277	0.114

28	11.8289	-0.0158	11.829	-0.0763
29	11.2668	-0.05	11.2669	-0.2544
30	10.6434	-0.0785	10.6437	-0.4223
31	9.9611	-0.1011	9.9616	-0.5814
32	9.2222	-0.118	9.223	-0.733
33	8.4294	-0.1292	8.4304	-0.8779
34	7.585	-0.1347	7.5862	-1.0172
35	6.6912	-0.1345	6.6925	-1.1516
36	5.7495	-0.1286	5.751	-1.2817
37	4.7605	-0.117	4.7619	-1.4082
38	3.7221	-0.0995	3.7234	-1.5318
39	2.6268	-0.0758	2.6279	-1.6532
40	1.4527	-0.045	1.4534	-1.7747
E	0.0	0.0	0.0	0.0

Wire No. 4 :

Pulse No.	Real (Amps)	Imaginary (Amps)	Magnitude (Amps)	Phase (Degrees)
41	-4.1769	5.8615	7.1975	125.4741
42	-4.0876	5.7812	7.0803	125.2625
43	-4.0045	5.6933	6.9606	125.1209
44	-3.9072	5.5813	6.813	124.9941
45	-3.7937	5.4433	6.6349	124.8747
46	-3.6635	5.2791	6.4258	124.7595
47	-3.5167	5.0889	6.1858	124.6462
48	-3.3535	4.8733	5.9157	124.5338
49	-3.1747	4.6328	5.6162	124.4212
50	-2.9809	4.3685	5.2886	124.3078
51	-2.7729	4.0812	4.9341	124.1932
52	-2.5516	3.772	4.554	124.077
53	-2.318	3.4419	4.1496	123.959
54	-2.0729	3.0919	3.7224	123.8389
55	-1.8171	2.723	3.2736	123.7167
56	-1.5515	2.3358	2.8041	123.5923
57	-1.2762	1.9307	2.3144	123.4655
58	-0.9912	1.5069	1.8037	123.3365
59	-0.6947	1.0614	1.2685	123.2046
60	-0.3813	0.5856	0.6988	123.0682
E	0.0	0.0	0.0	0.0

********** BASE OPERATING PARAMETERS **********

Twr.	Ratio	Phase
1	0.484	-128.8
2	1.000	0.0
3	0.516	123.6

WESTBERG CIRCUIT ANALYSIS PROGRAM

FILE NAME = KLVZ-M1D.CIR

I	6.7847	0	1	-126.8433	.0000	.0000
R	1.0000	1	2	.0000	.0000	.0000
L	628.8000	2	0	.0000	.0000	.0000
L	5.9600	2	3	.0000	.0000	.0000
C	.0001	3	0	.0000	.0000	.0000
R	7.6000	3	0	34.2000	.0000	.0000
EX	.0000	0	0	.0000	.0000	.0000

FREQ = .810

NODE	VOLT MAG	VOLT PHASE
1	436.5273	-44.4657
2	435.6793	-43.5813
3	236.6669	-49.4371

				BRANCH VOLTAGE		BRANCH CURRENT		FROM NODE IMPEDANCE		TO NODE IMPEDANCE	
				MAG	PHASE	MAG	PHASE	RESISTANCE	REACTANCE	RESISTANCE	REACTANCE
VSWR											
R	1-	2	1.000	6.78	-126.843	6.78	-126.843	8.53	63.77	7.53	63.77
L	2-	0	628.800	435.68	-43.581	.14	-133.581	.00	3200.20	.00	.00
L	2-	3	5.960	201.70	-36.706	6.65	-126.706	7.84	65.05	7.84	34.72
C	3-	0	.000	236.67	-49.437	.11	40.563	.00	-2183.20	.00	.00
R	3-	0	7.600	236.67	-49.437	6.76	-126.908	7.60	34.20	.00	.00

FILE NAME = KLVZ-2D.CIR

I	14.0900	0	1	2.0235	.0000	.0000
R	1.0000	1	2	.0000	.0000	.0000
L	628.8000	2	0	.0000	.0000	.0000
L	5.4100	2	3	.0000	.0000	.0000
C	.0001	3	0	.0000	.0000	.0000
R	18.8000	3	0	-13.1000	.0000	.0000
EX	.0000	0	0	.0000	.0000	.0000

FREQ = .810

NODE	VOLT MAG	VOLT PHASE
1	340.8310	38.5690
2	329.6180	40.0275
3	319.6955	-32.9503

				BRANCH VOLTAGE		BRANCH CURRENT		FROM NODE IMPEDANCE		TO NODE IMPEDANCE	
				MAG	PHASE	MAG	PHASE	RESISTANCE	REACTANCE	RESISTANCE	REACTANCE
VSWR											
R	1-	2	1.000	14.09	2.024	14.09	2.024	19.43	14.40	18.43	14.40
L	2-	0	628.800	329.62	40.028	.10	-49.972	.00	3200.20	.00	.00
L	2-	3	5.410	386.21	92.355	14.03	2.355	18.60	14.36	18.60	-13.17
C	3-	0	.000	319.70	-32.950	.13	57.050	.00	-2456.09	.00	.00
R	3-	0	18.800	319.70	-32.950	13.95	1.919	18.80	-13.10	.00	.00

FILE NAME = KLVZ-3D.CIR

I	7.2407	0	1	125.5341	.0000	.0000
R	1.0000	1	2	.0000	.0000	.0000
L	628.8000	2	0	.0000	.0000	.0000
L	1.6200	2	3	.0000	.0000	.0000
C	.0001	3	0	.0000	.0000	.0000
R	7.4000	3	0	-28.0000	.0000	.0000
EX	.0000	0	0	.0000	.0000	.0000

FREQ = .810

NODE	VOLT MAG	VOLT PHASE
1	153.9398	58.5802
2	151.2521	56.0554
3	208.6039	50.2977

				BRANCH VOLTAGE		BRANCH CURRENT		FROM NODE IMPEDANCE		TO NODE IMPEDANCE	
				MAG	PHASE	MAG	PHASE	RESISTANCE	REACTANCE	RESISTANCE	REACTANCE
VSWR											
R	1-	2	1.000	7.24	125.534	7.24	125.534	8.32	-19.56	7.32	-19.56
L	2-	0	628.800	151.25	56.055	.05	-33.945	.00	3200.20	.00	.00
L	2-	3	1.620	60.06	-144.336	7.28	125.664	7.23	-19.46	7.23	-27.71
C	3-	0	.000	208.60	50.298	.08	140.298	.00	-2456.09	.00	.00
R	3-	0	7.400	208.60	50.298	7.20	125.494	7.40	-28.00	.00	.00

Direct Measurement of Power

Common point impedance measurements were made using a Delta CPB-1A common point bridge installed in the common point bus of the phasing and coupling system. The resistance value was adjusted to 50 ohms and the reactance value was adjusted to zero.