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Wiley Rein LLP

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SEP - 5 2013

Federal Communications Commission
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September 5, 2013

Marnie K. Sarver
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2013 SEP -9 A 7:14

BY HAND VIA COURIER

Marlene H. Dortch, Secretary
Federal Communications Commission
445 Twelfth Street, S.W.
12th Street Lobby, TW-A325
Washington, DC 20554

Re: **LBI Radio License LLC – FRN 0003748613**
Station KHJ(AM), Los Angeles, CA (Fac. ID 37224)
Application for Station License - BMML-20130719CZJ
AMENDMENT

0003748613

Dear Ms. Dortch:

On behalf of LBI Radio License LLC, licensee of AM station KHJ, Los Angeles, California, we are submitting herewith an original and two copies of an amendment to the above-referenced application for license to cover Construction Permit BP-20120504AAF.

The amendment consists of a revised Section III of Form 302-AM, including a supplement to **Exhibit 10** entitled "**Further Clarification – KHJ Intermodulation Product Observations**." The amendment is filed in response to a request by staff processing the license application.

Should there be any questions concerning this amendment, please contact the undersigned.

Sincerely,

Marnie K. Sarver

Marnie K. Sarver

Enclosure

LBI Radio License LLC
Station KHJ(AM), Los Angeles, CA
Application for Station License
File No. BMML-20130719CZJ

AMENDMENT

The above-referenced application for station license is hereby amended to include the attached revised engineering Section III of FCC Form 302-AM, prepared by Ronald D. Rackley, P.E., the applicant's consulting engineer.

Dated this 4th day of September 2013

LBI Radio License LLC

By ______________________
Nicholas R. Simmons
General Counsel

SECTION III - LICENSE APPLICATION ENGINEERING DATA

Name of Applicant
LBI RADIO LICENSE LLC

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	Power in kilowatts Day
KHJ	BP -20120504AAF	930	UNLIIMITED	5.0	5.0

2. Station location

State	City or Town
CA	LOS ANGELES

3. Transmitter location

State	County	City or Town	Street address (or other identification)
CA	LOS ANGELES	LOS ANGELES	1700 N. ALVARADO BLVD.

4. Main studio location

State	County	City or Town	Street address (or other identification)
CA	LOS ANGELES	BURBANK	1845 EMPIRE AVENUE

5. Remote control point location (specify only if authorized directional antenna)

State	County	City or Town	Street address (or other identification)
CA	LOS ANGELES	BURBANK	1845 EMPIRE AVENUE

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.
TECH EXHIBIT

8. Operating constants:

RF common point or antenna current (in amperes) without modulation for night system	RF common point or antenna current (in amperes) without modulation for day system
10.4	10.0

Measured antenna or common point resistance (in ohms) at operating frequency Night	Day	Measured antenna or common point reactance (in ohms) at operating frequency Night	Day
50.0	50.0	+j 0.0	+j 0.0

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 UNUSED	N/A	N/A	N/A	N/A	N/A	N/A
2 UNUSED	N/A	N/A	N/A	N/A	N/A	N/A
3	0.0	N/A	1.000	N/A	N/A	N/A
4	-131.7	N/A	0.144	N/A	N/A	N/A
5	-129.6	N/A	0.492	N/A	N/A	N/A
6 UNUSED	N/A	N/A	N/A	N/A	N/A -	N/A

Manufacturer and type of antenna monitor: POTOMAC INSTRUMENTS AM-1901

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.
UNIFORM CROSS-SECTION, GUYED	61.0	62.5	3&4: 63.4; 5: 62.5	Exhibit No. N/A

Excitation ☑ Series ☐ Shunt

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

North Latitude 34 ° 05 ' 08 "	West Longitude 118 ° 15 ' 24 "

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. N/A

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

NONE

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

NEW TRANSMITTER SITE FOR KHJ

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
RONALD D. RACKLEY, P.E.	Ronald D. Rackley
Address (include ZIP Code) DUTREIL, LUNDIN & RACKLEY, INC. 201 FLETCHER AVENUE SARASOTA, FL 34237	Date JULY 08, 2013 Telephone No. (Include Area Code) 941-329-6000

☐ Technical Director ☑ Registered Professional Engineer

☐ Chief Operator ☐ Technical Consultant

☐ Other (specify)

APPLICATION FOR LICENSE INFORMATION
RADIO STATION KHJ
LOS ANGELES, CALIFORNIA

July 8, 2013

930 KHZ 5 KW DA-N

APPLICATION FOR LICENSE INFORMATION

RADIO STATION KHJ
LOS ANGELES, CALIFORNIA

930 KHZ 5 KW DA-N

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Executive Summary - KHJ

This engineering exhibit supports an application for license for the newly constructed antenna system of radio station KHJ in Los Angeles, California. KHJ is presently licensed to operate fulltime on 930 kilohertz with 5 kilowatts, employing a directional antenna pattern at night. Construction Permit BP-20120504AAF authorizes operation on 930 kilohertz with 5 kilowatts fulltime at a new location and with a new antenna system.

The new antenna system shares towers with two other stations that operate from the transmitter site, KYPA on 1230 kilohertz and KBLA on 1580 kilohertz. Filters are employed at the tower bases to isolate the ATU outputs of each station from those of the others and at the phasor inputs to isolate the transmitters and avoid development of excessive spurious intermodulation products. KHJ uses one of the six KBLA towers in the daytime and three of them at night. Towers that are not in use by KHJ are detuned at 930 kilohertz. Proof of performance information on the other stations following installation of the new equipment to add KHJ at the transmitter site is being simultaneously filed with the FCC in an application for direct measurement of power for KBLA and an application for license for KYPA.

The towers and ground system are in accordance with the terms of the KHJ construction permit and specifications that were provided in the application for construction permit. New directional antenna phasing and coupling equipment has been installed and it has been adjusted to produce the authorized directional antenna patterns.

Information is provided herein demonstrating that the directional antenna parameters for the nighttime pattern have been determined in accordance with the requirements of section 73.151(c) of the FCC Rules. The antenna system has been adjusted to produce antenna monitor parameters within +/- 5 percent in ratio and +/- 3 degrees in phase of the modeled values, as required by the Rules.

Information regarding direct measurement of power for both the daytime nondirectional and nighttime directional antenna patterns and radiofrequency radiation protection measures at the site is also included herein.

Program test authority for the nighttime directional antenna is hereby requested.

Ronald D. Rackley

Ronald D. Rackley, P.E.
July 8, 2013

Analysis of Tower Impedance Measurements to Verify Method of Moments Model – KHJ

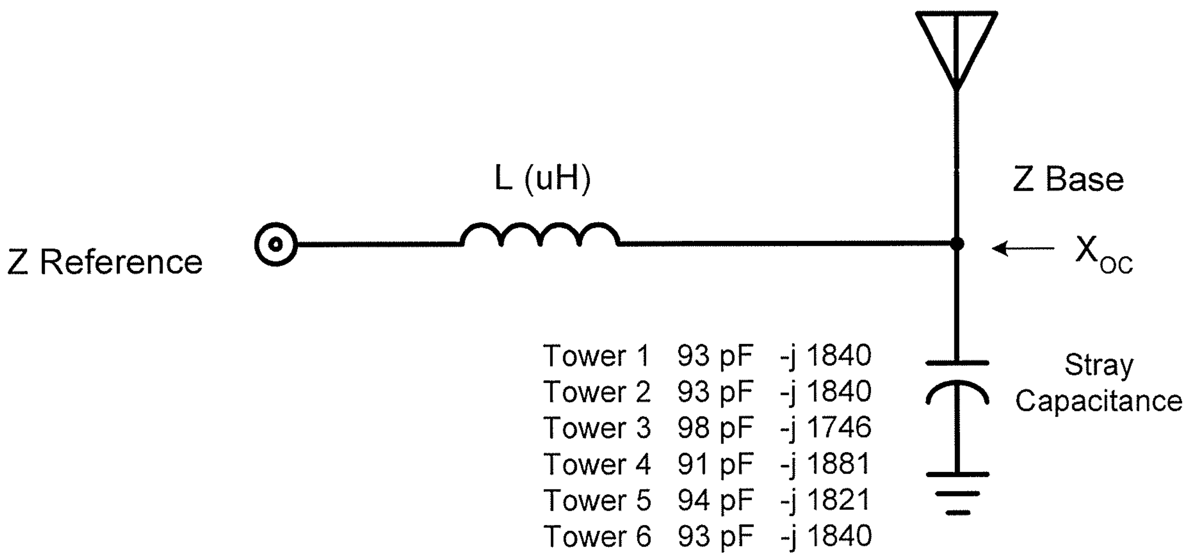
Tower base impedance measurements were made at the final J-plugs within the filter units using a Hewlett-Packard 8751A vector network analyzer and a Tunwall Radio directional coupler in a calibrated measurement system. The other towers were all open circuited at the same points where impedance measurements were made for them (the "reference points") for each of the measurements. There were no conductive paths to ground at any of the tower bases; the sampling line isolation coils were all temporarily disconnected for the measurements, as were the tower light isolation chokes at towers 1, 3, 4 and 6.

The reference point at each tower is adjacent to where the feedline exits the filter unit at the output of its enclosure. The current passes directly from that point over conductors through the enclosure insulator and on to the tower above the base insulator. An assumed value for the sum of the base insulator and base region stray capacitances across the ATU output was employed in the base circuit calculations for each tower. Circuit calculations were performed to relate the method of moments modeled impedances of the tower feedpoints to the filter unit output measurement (reference) points as shown on the following pages. The Xoc shown for each tower, which was calculated for the assumed base conditions, was used in the method of moments model as a load at ground level for the open circuited case.

In addition to the page showing the schematic of the assumed circuit and tabulation of calculated values, pages showing the results of calculations using the WCAP network analysis program from Westberg Consulting are provided. WCAP performs such calculations using nodal analysis, as do other modern circuit analysis programs such as the commonly available ones based on SPICE software.

In each of the WCAP tabulations, node 2 represents the filter unit output reference point and node 3 represents the tower feedpoint. Node 0 represents ground potential. The numerals in the file names shown on the tabulations correspond to the tower numbers. It should be noted that the calculated reference point impedances appear under the "TO NODE IMPEDANCE" columns of the WCAP tabulations, following the phantom 1.0 ohm resistors (R 1 - 2) that were included in series with the drive current sources (I 0 -1)) to provide calculation points for the impedances. The tower base impedances from the method of moments model are represented by complex loads from node 3 to ground (R 3 - 0). The shunt capacitances shown for the towers on the schematic were used for the calculations, although they only appear to the nearest 0.0001 microfarad on the WCAP printout due to rounding.

The modeled and measured base impedances at the reference points with the other towers open circuited at their filter unit output jacks agree within +/- 2 ohms and +/- 4 percent for resistance and reactance, as required by the FCC Rules.



TOWER	L (uH)	X_L	X_{OC}	Z Base (Modeled)	Z Reference (Modeled)	Z Reference (Measured)
1	1.30	+ j 7.6	- j 1840	19.04 -j 77.58	17.53 -j 67.02	19.1 -j 65.0
2	0.80	+ j 4.7	- j 1840	18.75 -j 81.35	17.19 -j 73.40	19.7 -j 71.5
3	0.90	+ j 5.3	- j 1746	19.55 -j 74.14	17.99 -j 66.06	18.4 -j 65.8
4	1.30	+ j 7.6	- j 1881	19.47 -j 74.73	18.01 -j 64.46	17.4 -j 64.7
5	1.30	+ j 7.6	- j 1821	18.83 -j 80.76	17.26 -j 69.90	19.0 -j 70.0
6	1.30	+j 7.6	- j 1840	18.79 -j 79.36	17.27 -j 68.65	18.2 -j 69.6

ANALYSIS OF TOWER IMPEDANCE MEASUREMENTS TO VERIFY METHOD OF MOMENTS MODEL

RADIO STATION KHJ
LOS ANGELES, CALIFORNIA
930 KHZ 5 KW U DA-N

du Treil, Lundin & Rackley, Inc. Sarasota, Florida

Tower 1 Individually Driven Base Circuit Analysis

WESTBERG CIRCUIT ANALYSIS PROGRAM

FILE NAME = KHJ1OC.TXT

I	1.0000	0	1	0.0000	0.0000	0.0000
R	1.0000	1	2	0.0000	0.0000	0.0000
L	1.3000	2	3	0.0000	0.0000	0.0000
C	0.0001	3	0	0.0000	0.0000	0.0000
R	19.0430	3	0	-77.5840	0.0000	0.0000
EX	0.0000	0	0	0.0000	0.0000	0.0000

FREQ = 0.930

NODE	VOLT MAG	VOLT PHASE
1	69.5378	-74.5440
2	69.2780	-75.3412
3	76.6512	-76.7783

				BRANCH VOLTAGE		BRANCH CURRENT		FROM NODE IMPEDANCE		TO NODE IMPEDANCE	
				MAG	PHASE	MAG	PHASE	RESISTANCE	REACTANCE	RESISTANCE	REACTANCE
R	1-	2	1.000	1.00	0.000	1.00	0.000	18.53	-67.02	17.53	-67.02
L	2-	3	1.300	7.60	90.000	1.00	0.000	17.53	-67.02	17.53	-74.62
C	3-	0	0.000	76.65	-76.778	0.04	13.222	0.00	-1840.15	0.00	-1840.15
R	3-	0	19.043	76.65	-76.778	0.96	-0.569	19.04	-77.58	19.04	-77.58

Tower 2 Individually Driven Base Circuit Analysis

WESTBERG CIRCUIT ANALYSIS PROGRAM

FILE NAME = KHJ2OC.TXT

I	1.0000	0	1	0.0000	0.0000	0.0000
R	1.0000	1	2	0.0000	0.0000	0.0000
L	0.8000	2	3	0.0000	0.0000	0.0000
C	0.0001	3	0	0.0000	0.0000	0.0000
R	18.7460	3	0	-81.3520	0.0000	0.0000
EX	0.0000	0	0	0.0000	0.0000	0.0000

FREQ = 0.930

NODE	VOLT MAG	VOLT PHASE
1	75.6213	-76.0810
2	75.3870	-76.8188
3	79.9456	-77.5827

				BRANCH VOLTAGE		BRANCH CURRENT		FROM NODE IMPEDANCE		TO NODE IMPEDANCE	
				MAG	PHASE	MAG	PHASE	RESISTANCE	REACTANCE	RESISTANCE	REACTANCE
R	1-	2	1.000	1.00	0.000	1.00	0.000	18.19	-73.40	17.19	-73.40
L	2-	3	0.800	4.67	90.000	1.00	0.000	17.19	-73.40	17.19	-78.08
C	3-	0	0.000	79.95	-77.583	0.04	12.417	0.00	-1840.15	0.00	-1840.15
R	3-	0	18.746	79.95	-77.583	0.96	-0.559	18.75	-81.35	18.75	-81.35

Tower 3 Individually Driven Base Circuit Analysis

```
WESTBERG CIRCUIT ANALYSIS PROGRAM

FILE NAME = KHJ3OC.TXT

I     1.0000    0    1    0.0000    0.0000    0.0000
R     1.0000    1    2    0.0000    0.0000    0.0000
L     0.9000    2    3    0.0000    0.0000    0.0000
C     0.0001    3    0    0.0000    0.0000    0.0000
R    19.5510    3    0  -74.1410    0.0000    0.0000
EX    0.0000    0    0    0.0000    0.0000    0.0000

FREQ = 0.930

  NODE        VOLT MAG      VOLT PHASE
   1          68.7307        -73.9618
   2          68.4612        -74.7662
   3          73.5484        -75.8427
                              BRANCH VOLTAGE       BRANCH CURRENT FROM NODE IMPEDANCE  TO NODE IMPEDANCE
                              MAG       PHASE       MAG        PHASE RESISTANCE REACTANCE RESISTANCE REACTANCE
R    1-  2       1.000        1.00      0.000       1.00      0.000      18.99     -66.06      17.99     -66.06
L    2-  3       0.900        5.26     90.000       1.00      0.000      17.99     -66.06      17.99     -71.31
C    3-  0       0.000       73.55    -75.843       0.04     14.157       0.00   -1746.27       0.00   -1746.27
R    3-  0      19.551       73.55    -75.843       0.96     -0.615      19.55     -74.14      19.55     -74.14
```

Tower 4 Individually Driven Base Circuit Analysis

```
WESTBERG CIRCUIT ANALYSIS PROGRAM

FILE NAME = KHJ4OC.TXT

I     1.0000    0    1    0.0000    0.0000    0.0000
R     1.0000    1    2    0.0000    0.0000    0.0000
L     1.3000    2    3    0.0000    0.0000    0.0000
C     0.0001    3    0    0.0000    0.0000    0.0000
R    19.4680    3    0  -74.7340    0.0000    0.0000
EX    0.0000    0    0    0.0000    0.0000    0.0000

FREQ = 0.930

  NODE        VOLT MAG      VOLT PHASE
   1          67.2042        -73.5716
   2          66.9282        -74.3928
   3          74.2726        -75.9695
                              BRANCH VOLTAGE       BRANCH CURRENT FROM NODE IMPEDANCE  TO NODE IMPEDANCE
                              MAG       PHASE       MAG        PHASE RESISTANCE REACTANCE RESISTANCE REACTANCE
R    1-  2       1.000        1.00      0.000       1.00      0.000      19.01     -64.46      18.01     -64.46
L    2-  3       1.300        7.60     90.000       1.00      0.000      18.01     -64.46      18.01     -72.06
C    3-  0       0.000       74.27    -75.970       0.04     14.030       0.00   -1880.60       0.00   -1880.60
R    3-  0      19.468       74.27    -75.970       0.96     -0.570      19.47     -74.73      19.47     -74.73
```

Tower 5 Individually Driven Base Circuit Analysis

WESTBERG CIRCUIT ANALYSIS PROGRAM

FILE NAME = KHJ5OC.TXT

I	1.0000	0	1	0.0000	0.0000	0.0000
R	1.0000	1	2	0.0000	0.0000	0.0000
L	1.3000	2	3	0.0000	0.0000	0.0000
C	0.0001	3	0	0.0000	0.0000	0.0000
R	18.8260	3	0	-80.7580	0.0000	0.0000
EX	0.0000	0	0	0.0000	0.0000	0.0000

FREQ = 0.930

NODE	VOLT MAG	VOLT PHASE
1	72.2478	-75.3610
2	72.0015	-76.1309
3	79.3973	-77.4451

			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	0.000	1.00	0.000	18.26	-69.90	17.26	-69.90
L	2- 3	1.300	7.60	90.000	1.00	0.000	17.26	-69.90	17.26	-77.50
C	3- 0	0.000	79.40	-77.445	0.04	12.555	0.00	-1820.58	0.00	-1820.58
R	3- 0	18.826	79.40	-77.445	0.96	-0.567	18.83	-80.76	18.83	-80.76

Tower 6 Individually Driven Base Circuit Analysis

WESTBERG CIRCUIT ANALYSIS PROGRAM

FILE NAME = KHJ6OC.TXT

I	1.0000	0	1	0.0000	0.0000	0.0000
R	1.0000	1	2	0.0000	0.0000	0.0000
L	1.3000	2	3	0.0000	0.0000	0.0000
C	0.0001	3	0	0.0000	0.0000	0.0000
R	18.7890	3	0	-79.3550	0.0000	0.0000
EX	0.0000	0	0	0.0000	0.0000	0.0000

FREQ = 0.930

NODE	VOLT MAG	VOLT PHASE
1	71.0356	-75.0997
2	70.7850	-75.8819
3	78.1739	-77.2401

			BRANCH VOLTAGE		BRANCH CURRENT		FROM NODE IMPEDANCE		TO NODE IMPEDANCE	
			MAG	PHASE	MAG	PHASE	RESISTANCE	REACTANCE	RESISTANCE	REACTANCE
R	1- 2	1.000	1.00	0.000	1.00	0.000	18.27	-68.65	17.27	-68.65
L	2- 3	1.300	7.60	90.000	1.00	0.000	17.27	-68.65	17.27	-76.24
C	3- 0	0.000	78.17	-77.240	0.04	12.760	0.00	-1840.15	0.00	-1840.15
R	3- 0	18.789	78.17	-77.240	0.96	-0.561	18.79	-79.36	18.79	-79.36

Derivation of Operating Parameters for Nighttime Directional Antenna - KHJ

The method of moments model of the array, following verification with the measured individual open circuited base impedances, was utilized for directional antenna calculations. Calculations were made to determine the complex voltage values for sources located at ground level under each tower of the array to produce current moment sums for the towers that, when normalized, equated to the theoretical field parameters of the authorized directional antenna pattern. With these voltage sources, the tower currents were calculated. Twelve segments were used for each tower, so that the modeled current pulse between the fourth and fifth segments above ground level corresponds to the sampling loop location on each tower – at 1/3 of the total tower height above the base insulator. As the tower structures, sampling loops and sampling lines are identical, the antenna monitor ratios and phases corresponding to the theoretical parameters were calculated directly from the modeled tower currents.

Tower	Modeled Current Pulse	Modeled Current Magnitude (amperes)	Modeled Current Phase (degrees)	Modeled Antenna Monitor Ratio	Modeled Antenna Monitor Phase (degrees)
1	5	0.0158	324.3	Nulled	--
2	17	0.0260	317.2	Nulled	--
3	29	12.672	0.0	1.000	0.0
4	41	1.819	228.3	0.144	-131.7
5	53	6.240	230.4	0.492	-129.6
6	65	0.0255	319.9	Nulled	--

Method of Moments Model Details for Towers Driven Individually – KHJ

The array of towers was modeled using Expert MININEC Broadcast Professional Version 14.5. One wire was used to represent each tower. The tower geometry was specified using the geographic coordinate system. Each tower was modeled using 12 wire segments. The towers are all physically 68.0 degrees in electrical height and their segment length is 5.7 electrical degrees.

The individual tower characteristics were adjusted to provide a match of their modeled impedances, when presented to a circuit model which included branches representing the shunt capacitances and feedline hookup inductances, with the base impedances that were measured at the output jacks of the filter units while the other towers of the array were open circuited. All towers were completely open circuited, with their sampling line isolation coils and lighting chokes disconnected. The method of moments model assumed loads at ground level having the reactances that were calculated for them using the base circuit models for the open circuited towers of the array.

Each tower's modeled height relative to its physical height falls within the required range of 75 to 125 percent and each modeled radius falls within the required range of 80 percent to 150 percent of the radius of a circle having a circumference equal to the sum of the widths of the tower sides. The array consists of triangular uniform cross section towers having a face width of 19 nches.

TOWER	Physical Height (meters)	Modeled Height (meters)	Modeled Percent of Height	Modeled Radius (meters)	Percent Equivalent Radius
1	61.0	64.5	105.7	0.240	104.2
2	61.0	64.0	104.9	0.240	104.2
3	61.0	65.0	106.6	0.240	104.2
4	61.0	64.9	106.4	0.240	104.2
5	61.0	64.1	105.1	0.240	104.2
6	61.0	64.2	105.2	0.240	104.2

The following pages show the details of the method of moments models for the individually driven towers. The numerals in the file names shown on the tabulations correspond to the tower numbers.

Tower 1 Driven Individually

C:\MBPRO14.5\KHJ MBPRO 14.5 FILES(MWF)\KHJOC1 06-20-2013 10:42:32

IMPEDANCE
normalization = 50.

freq (KHz)	resist (ohms)	react (ohms)	imped (ohms)	phase (deg)	VSWR	S11 dB	S12 dB
source = 1; node 1, sector 1							
930.	19.043	-77.584	79.887	283.8	9.2197	-1.8916	-4.521

GEOMETRY
Dimensions in meters
Environment: perfect ground

wire	caps	Distance	Angle	Z	radius	segs
1	none	0	0	0	.24	12
		0	0	64.5		
2	none	42.16	20.	0	.24	12
		42.16	20.	64.		
3	none	84.33	20.	0	.24	12
		84.33	20.	65.		
4	none	42.16	127.	0	.24	12
		42.16	127.	64.9		
5	none	50.18	73.5	0	.24	12
		50.18	73.5	64.1		
6	none	82.54	49.3	0	.24	12
		82.54	49.3	64.2		

Number of wires = 6
current nodes = 72

	minimum		maximum	
Individual wires	wire	value	wire	value
segment length	2	5.33333	3	5.41667
segment/radius ratio	2	22.2222	3	22.5694
radius	1	.24	1	.24

ELECTRICAL DESCRIPTION
Frequencies (KHz)

no.	frequency lowest	step	no. of steps	segment length (wavelengths) minimum	maximum
1	930.	0	1	.0165444	.0168029

Sources

source	node	sector	magnitude	phase	type
1	1	1	1.	0	voltage

Lumped loads

load	node	resistance (ohms)	reactance (ohms)	inductance (mH)	capacitance (uF)	passive circuit
1	13	0	-1,840.	0	0	0
2	25	0	-1,746.	0	0	0
3	37	0	-1,881.	0	0	0
4	49	0	-1,821.	0	0	0
5	61	0	-1,840.	0	0	0

Tower 2 Driven Individually

C:\MBPRO14.5\KHJ MBPRO 14.5 FILES(MWF)\KHJOC2 06-20-2013 10:46:03

IMPEDANCE
normalization = 50.

freq (KHz)	resist (ohms)	react (ohms)	imped (ohms)	phase (deg)	VSWR	S11 dB	S12 dB
source = 1; node 13, sector 1							
930.	18.746	-81.352	83.484	283.	10.003	-1.7425	-4.8082

GEOMETRY
Dimensions in meters
Environment: perfect ground

wire	caps	Distance	Angle	Z	radius	segs
1	none	0	0	0	.24	12
		0	0	64.5		
2	none	42.16	20.	0	.24	12
		42.16	20.	64.		
3	none	84.33	20.	0	.24	12
		84.33	20.	65.		
4	none	42.16	127.	0	.24	12
		42.16	127.	64.9		
5	none	50.18	73.5	0	.24	12
		50.18	73.5	64.1		
6	none	82.54	49.3	0	.24	12
		82.54	49.3	64.2		

Number of wires = 6
current nodes = 72

	minimum		maximum	
Individual wires	wire	value	wire	value
segment length	2	5.33333	3	5.41667
segment/radius ratio	2	22.2222	3	22.5694
radius	1	.24	1	.24

ELECTRICAL DESCRIPTION
Frequencies (KHz)

	frequency		no. of	segment length (wavelengths)	
no.	lowest	step	steps	minimum	maximum
1	930.	0	1	.0165444	.0168029

Sources

source	node	sector	magnitude	phase	type
1	13	1	1.	0	voltage

Lumped loads

load	node	resistance (ohms)	reactance (ohms)	inductance (mH)	capacitance (uF)	passive circuit
1	1	0	-1,840.	0	0	0
2	25	0	-1,746.	0	0	0
3	37	0	-1,881.	0	0	0
4	49	0	-1,821.	0	0	0
5	61	0	-1,840.	0	0	0

Tower 3 Driven Individually

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IMPEDANCE
normalization = 50.

freq (KHz)	resist (ohms)	react (ohms)	imped (ohms)	phase (deg)	VSWR	S11 dB	S12 dB
source = 1; node 25, sector 1							
930.	19.551	-74.141	76.675	284.8	8.4533	-2.0647	-4.2208

GEOMETRY
Dimensions in meters
Environment: perfect ground

wire	caps	Distance	Angle	Z	radius	segs
1	none	0	0	0	.24	12
		0	0	64.5		
2	none	42.16	20.	0	.24	12
		42.16	20.	64.		
3	none	84.33	20.	0	.24	12
		84.33	20.	65.		
4	none	42.16	127.	0	.24	12
		42.16	127.	64.9		
5	none	50.18	73.5	0	.24	12
		50.18	73.5	64.1		
6	none	82.54	49.3	0	.24	12
		82.54	49.3	64.2		

Number of wires = 6
current nodes = 72

	minimum		maximum	
Individual wires	wire	value	wire	value
segment length	2	5.33333	3	5.41667
segment/radius ratio	2	22.2222	3	22.5694
radius	1	.24	1	.24

ELECTRICAL DESCRIPTION
Frequencies (KHz)

no.	frequency lowest	step	no. of steps	segment length (wavelengths) minimum	maximum
1	930.	0	1	.0165444	.0168029

Sources

source	node	sector	magnitude	phase	type
1	25	1	1.	0	voltage

Lumped loads

load	node	resistance (ohms)	reactance (ohms)	inductance (mH)	capacitance (uF)	passive circuit
1	1	0	-1,840.	0	0	0
2	13	0	-1,840.	0	0	0
3	37	0	-1,881.	0	0	0
4	49	0	-1,821.	0	0	0
5	61	0	-1,840.	0	0	0

Tower 4 Driven Individually

C:\MBPRO14.5\KHJ MBPRO 14.5 FILES(MWF)\KHJOC4   06-20-2013   12:58:47

IMPEDANCE
normalization = 50.

freq (KHz)	resist (ohms)	react (ohms)	imped (ohms)	phase (deg)	VSWR	S11 dB	S12 dB
source = 1; node 37, sector 1							
930.	19.468	-74.734	77.229	284.6	8.5789	-2.0342	-4.2714

GEOMETRY
Dimensions in meters
Environment: perfect ground

wire	caps	Distance	Angle	Z	radius	segs
1	none	0	0	0	.24	12
		0	0	64.5		
2	none	42.16	20.	0	.24	12
		42.16	20.	64.		
3	none	84.33	20.	0	.24	12
		84.33	20.	65.		
4	none	42.16	127.	0	.24	12
		42.16	127.	64.9		
5	none	50.18	73.5	0	.24	12
		50.18	73.5	64.1		
6	none	82.54	49.3	0	.24	12
		82.54	49.3	64.2		

Number of wires = 6
current nodes = 72

	minimum		maximum	
Individual wires	wire	value	wire	value
segment length	2	5.33333	3	5.41667
segment/radius ratio	2	22.2222	3	22.5694
radius	1	.24	1	.24

ELECTRICAL DESCRIPTION
Frequencies (KHz)

no.	frequency lowest	step	no. of steps	segment length (wavelengths) minimum	maximum
1	930.	0	1	.0165444	.0168029

Sources

source	node	sector	magnitude	phase	type
1	37	1	1.	0	voltage

Lumped loads

load	node	resistance (ohms)	reactance (ohms)	inductance (mH)	capacitance (uF)	passive circuit
1	1	0	-1,840.	0	0	0
2	13	0	-1,840.	0	0	0
3	25	0	-1,746.	0	0	0
4	49	0	-1,821.	0	0	0
5	61	0	-1,840.	0	0	0

Tower 5 Driven Individually

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IMPEDANCE
normalization = 50.

freq (KHz)	resist (ohms)	react (ohms)	imped (ohms)	phase (deg)	VSWR	S11 dB	S12 dB
source = 1; node 49, sector 1							
930.	18.826	-80.758	82.923	283.1	9.8598	-1.768	-4.7571

GEOMETRY
Dimensions in meters
Environment: perfect ground

wire	caps	Distance	Angle	Z	radius	segs
1	none	0	0	0	.24	12
		0	0	64.5		
2	none	42.16	20.	0	.24	12
		42.16	20.	64.		
3	none	84.33	20.	0	.24	12
		84.33	20.	65.		
4	none	42.16	127.	0	.24	12
		42.16	127.	64.9		
5	none	50.18	73.5	0	.24	12
		50.18	73.5	64.1		
6	none	82.54	49.3	0	.24	12
		82.54	49.3	64.2		

Number of wires = 6
current nodes = 72

	minimum		maximum	
Individual wires	wire	value	wire	value
segment length	2	5.33333	3	5.41667
segment/radius ratio	2	22.2222	3	22.5694
radius	1	.24	1	.24

ELECTRICAL DESCRIPTION
Frequencies (KHz)

no.	frequency lowest	step	no. of steps	segment length (wavelengths) minimum	maximum
1	930.	0	1	.0165444	.0168029

Sources

source	node	sector	magnitude	phase	type
1	49	1	1.	0	voltage

Lumped loads

load	node	resistance (ohms)	reactance (ohms)	inductance (mH)	capacitance (uF)	passive circuit
1	1	0	-1,840.	0	0	0
2	13	0	-1,840.	0	0	0
3	25	0	-1,746.	0	0	0
4	37	0	-1,881.	0	0	0
5	61	0	-1,840.	0	0	0

Tower 6 Driven Individually

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IMPEDANCE
normalization = 50.

freq (KHz)	resist (ohms)	react (ohms)	imped (ohms)	phase (deg)	VSWR	S11 dB	S12 dB
source = 1; node 61, sector 1							
930.	18.789	-79.355	81.549	283.3	9.636	-1.8093	-4.676

GEOMETRY
Dimensions in meters
Environment: perfect ground

wire	caps	Distance	Angle	Z	radius	segs
1	none	0	0	0	.24	12
		0	0	64.5		
2	none	42.16	20.	0	.24	12
		42.16	20.	64.		
3	none	84.33	20.	0	.24	12
		84.33	20.	65.		
4	none	42.16	127.	0	.24	12
		42.16	127.	64.9		
5	none	50.18	73.5	0	.24	12
		50.18	73.5	64.1		
6	none	82.54	49.3	0	.24	12
		82.54	49.3	64.2		

Number of wires = 6
current nodes = 72

Individual wires	minimum wire	minimum value	maximum wire	maximum value
segment length	2	5.33333	3	5.41667
segment/radius ratio	2	22.2222	3	22.5694
radius	1	.24	1	.24

ELECTRICAL DESCRIPTION
Frequencies (KHz)

no.	frequency lowest	step	no. of steps	segment length (wavelengths) minimum	maximum
1	930.	0	1	.0165444	.0168029

Sources

source	node	sector	magnitude	phase	type
1	61	1	1.	0	voltage

Lumped loads

load	node	resistance (ohms)	reactance (ohms)	inductance (mH)	capacitance (uF)	passive circuit
1	1	0	-1,840.	0	0	0
2	13	0	-1,840.	0	0	0
3	25	0	-1,746.	0	0	0
4	37	0	-1,881.	0	0	0
5	49	0	-1,821.	0	0	0

Method of Moments Model Details for Nighttime Directional Antenna- KHJ

The array of towers was modeled using Expert MININEC Broadcast Professional Version 14.5 with the individual towers characteristics that were verified by the individual tower impedance measurements. Calculations were made to determine the complex voltage values for sources located at ground level under each tower of the array to produce current moment sums for the towers that, when normalized, equated to the theoretical field parameters of the authorized directional antenna pattern. The following pages contain details of the method of moments model of the directional antenna pattern.

Tower	Wire	Base Node
1	1	1
2	2	13
3	3	25
4	4	37
5	5	49
6	6	61

It should be noted that voltages and currents shown on the tabulations that are not specified as "rms" values are the corresponding peak values.

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MEDIUM WAVE ARRAY SYNTHESIS FROM FIELD RATIOS

Frequency = 930.001 KHz

tower	field ratio magnitude	phase (deg)
1	.001	0
2	.001	0
3	1.	0
4	.143	-131.
5	.484	-129.4
6	.001	0

VOLTAGES AND CURRENTS - rms

source node	voltage magnitude	phase (deg)	current magnitude	phase (deg)
1	295.028	277.8	.464323	10.1
13	251.352	312.8	.367532	49.1
25	1,243.35	280.5	16.2675	1.2
37	285.171	235.5	2.03446	240.9
49	383.151	166.5	7.5979	232.3
61	244.918	314.7	.361056	50.9

Sum of square of source currents = 653.961
Total power = 5,000. watts

NOTE: The array synthesis calculations (above) were performed to solve for the base voltage drives required to produce the specified field parameters, including the detuned condition for towers 1, 2 and 6, which are unused by KHJ. A field ratio of 1/10th of a percent was used to represent the vanishingly small, and negligible, residual field contribution of each detuned tower in the array synthesis calculations. The base impedances were calculated and the model was revised to have voltage drives only for the towers of the nighttime directional antenna pattern, towers 3, 4 and 5, and detuning reactances to ground for the remaining towers. The detuning reactances are equal in magnitude and opposite in sign to the reactive component of the operating impedances that were determined using the voltage sources from the array synthesis calculations. The final model does not include voltage sources for the detuned towers because their base voltages are developed across the detuning reactances. The specified detuning reactances represent how the towers were detuned for normal operation. The following information is from the final model.

GEOMETRY
Dimensions in meters
Environment: perfect ground

wire	caps	Distance	Angle	Z	radius	segs
1	none	0	0	0	.24	12
		0	0	64.5		
2	none	42.16	20.	0	.24	12
		42.16	20.	64.		
3	none	84.33	20.	0	.24	12
		84.33	20.	65.		
4	none	42.16	127.	0	.24	12
		42.16	127.	64.9		
5	none	50.18	73.5	0	.24	12
		50.18	73.5	64.1		
6	none	82.54	49.3	0	.24	12
		82.54	49.3	64.2		

Number of wires = 6
current nodes = 72

	minimum		maximum	
Individual wires	wire	value	wire	value
segment length	2	5.33333	3	5.41667
segment/radius ratio	2	22.2222	3	22.5694
radius	1	.24	1	.24

ELECTRICAL DESCRIPTION
Frequencies (KHz)

	frequency		no. of	segment length (wavelengths)	
no.	lowest	step	steps	minimum	maximum
1	930.001	0	1	.0165444	.0168029

Sources

source	node	sector	magnitude	phase	type
1	25	1	1,758.37	280.5	voltage
2	37	1	403.293	235.5	voltage
3	49	1	541.857	166.5	voltage

Lumped loads

passive load circuit	node	resistance (ohms)	reactance (ohms)	inductance (mH)	capacitance (uF)	
1	1	0	634.3	0	0	0
2	13	0	679.8	0	0	0
3	61	0	674.5	0	0	0

IMPEDANCE
normalization = 50.

freq (KHz)	resist (ohms)	react (ohms)	imped (ohms)	phase (deg)	VSWR	S11 dB	S12 dB
source = 1; node 25, sector 1							
930.001	12.33	-75.511	76.511	279.3	13.476	-1.2914	-5.8969
source = 2; node 37, sector 1							
930.001	139.34	-11.882	139.84	355.1	2.81	-6.465	-1.1108
source = 3; node 49, sector 1							
930.001	20.685	-45.918	50.362	294.3	4.6546	-3.7913	-2.3486

CURRENT rms
Frequency = 930.001 KHz
Input power = 5,000. watts
Efficiency = 100. %
coordinates in meters

current no.	X	Y	Z	mag (amps)	phase (deg)	real (amps)	imaginary (amps)
GND	0	0	0	.466058	7.4	.462211	.0597587
2	0	0	5.375	.290318	7.2	.288019	.0364628
3	0	0	10.75	.176462	6.4	.175364	.01965
4	0	0	16.125	.0853912	3.	.0852721	4.51E-03
5	0	0	21.5	.0158273	324.3	.0128556	-9.23E-03
6	0	0	26.875	.0486137	206.	-.0436903	-.0213179
7	0	0	32.25	.0906377	200.2	-.085079	-.0312531
8	0	0	37.625	.117969	199.	-.111545	-.0383979
9	0	0	43.	.130031	198.9	-.123057	-.0420135
10	0	0	48.375	.126296	199.1	-.119357	-.0412851
11	0	0	53.75	.105925	199.5	-.0998691	-.0353035
12	0	0	59.125	.0672421	199.9	-.0632177	-.0229134
END	0	0	64.5	0	0	0	0
GND	39.6174	-14.4196	0	.37101	41.8	.276515	.247362
14	39.6174	-14.4196	5.33333	.223046	41.3	.167471	.147319
15	39.6174	-14.4196	10.6667	.130165	38.6	.101687	.0812569
16	39.6174	-14.4196	16.	.0600451	26.8	.0535904	.0270831
17	39.6174	-14.4196	21.3333	.0259817	317.2	.0190732	-.0176427
18	39.6174	-14.4196	26.6667	.0536592	265.4	-4.28E-03	-.0534882
19	39.6174	-14.4196	32.	.0823806	257.1	-.0183892	-.0803019
20	39.6174	-14.4196	37.3333	.100734	255.6	-.0250092	-.0975799
21	39.6174	-14.4196	42.6667	.107741	256.1	-.0258191	-.104602
22	39.6174	-14.4196	48.	.102932	257.4	-.0224232	-.10046
23	39.6174	-14.4196	53.3333	.085555	259.	-.0163067	-.0839866
24	39.6174	-14.4196	58.6667	.0540851	260.7	-8.73E-03	-.0533751
END	39.6174	-14.4196	64.	0	0	0	0
GND	79.2443	-28.8426	0	16.1976	1.2	16.1939	.346621
26	79.2443	-28.8426	5.41667	15.3638	.8	15.3624	.211718
27	79.2443	-28.8426	10.8333	14.5811	.5	14.5805	.124296
28	79.2443	-28.8426	16.25	13.6891	.2	13.689	.054319
29	79.2443	-28.8426	21.6667	12.6718	360.	12.6718	-1.92E-03
30	79.2443	-28.8426	27.0833	11.5275	359.8	11.5274	-.0457503
31	79.2443	-28.8426	32.5	10.2598	359.6	10.2595	-.0776174
32	79.2443	-28.8426	37.9167	8.87472	359.4	8.87418	-.0976144
33	79.2443	-28.8426	43.3333	7.37873	359.2	7.37798	-.105624
34	79.2443	-28.8426	48.75	5.77622	359.	5.77533	-.101358
35	79.2443	-28.8426	54.1667	4.0648	358.8	4.06392	-.084265
36	79.2443	-28.8426	59.5833	2.2212	358.6	2.22057	-.0531256
END	79.2443	-28.8426	65.	0	0	0	0
GND	-25.3725	-33.6705	0	2.03256	240.4	-1.00476	-1.76685
38	-25.3725	-33.6705	5.40833	2.01134	235.7	-1.13476	-1.66067

39	-25.3725	-33.6705	10.8167	1.97216	232.7	-1.19604	-1.56809
40	-25.3725	-33.6705	16.225	1.90854	230.3	-1.21995	-1.46774
41	-25.3725	-33.6705	21.6333	1.81857	228.3	-1.2107	-1.35699
42	-25.3725	-33.6705	27.0417	1.70123	226.5	-1.17009	-1.23494
43	-25.3725	-33.6705	32.45	1.55592	225.1	-1.09916	-1.10125
44	-25.3725	-33.6705	37.8583	1.38225	223.7	-.998543	-.955783
45	-25.3725	-33.6705	43.2667	1.1798	222.6	-.868621	-.798389
46	-25.3725	-33.6705	48.675	.947805	221.6	-.709303	-.628668
47	-25.3725	-33.6705	54.0833	.684307	220.6	-.519462	-.445461
48	-25.3725	-33.6705	59.4917	.383651	219.8	-.294958	-.245332
END	-25.3725	-33.6705	64.9	0	0	0	0
GND	14.2519	-48.1136	0	7.58306	232.2	-4.6426	-5.99576
50	14.2519	-48.1136	5.34167	7.32604	231.5	-4.55625	-5.73685
51	14.2519	-48.1136	10.6833	7.03967	231.1	-4.42178	-5.47767
52	14.2519	-48.1136	16.025	6.67898	230.7	-4.2285	-5.16997
53	14.2519	-48.1136	21.3667	6.24043	230.4	-3.97677	-4.80919
54	14.2519	-48.1136	26.7083	5.7249	230.1	-3.66841	-4.39513
55	14.2519	-48.1136	32.05	5.13506	229.9	-3.30596	-3.9293
56	14.2519	-48.1136	37.3917	4.4743	229.7	-2.89225	-3.41384
57	14.2519	-48.1136	42.7333	3.74595	229.6	-2.42995	-2.85088
58	14.2519	-48.1136	48.075	2.95211	229.4	-1.92088	-2.24169
59	14.2519	-48.1136	53.4167	2.09117	229.3	-1.36437	-1.58476
60	14.2519	-48.1136	58.7583	1.15045	229.2	-.752443	-.87027
END	14.2519	-48.1136	64.1	0	0	0	0
GND	53.8242	-62.5764	0	.36408	43.7	.26316	.251596
62	53.8242	-62.5764	5.35	.219593	43.2	.159975	.150429
63	53.8242	-62.5764	10.7	.128579	40.6	.097692	.0835996
64	53.8242	-62.5764	16.05	.0595853	28.9	.0521633	.0287993
65	53.8242	-62.5764	21.4	.0255271	319.9	.019532	-.0164358
66	53.8242	-62.5764	26.75	.0527384	267.3	-2.47E-03	-.0526805
67	53.8242	-62.5764	32.1	.0813105	258.9	-.0156642	-.0797874
68	53.8242	-62.5764	37.45	.0996636	257.4	-.0217404	-.0972634
69	53.8242	-62.5764	42.8	.106765	257.9	-.0223495	-.1044
70	53.8242	-62.5764	48.15	.102114	259.2	-.0191008	-.100312
71	53.8242	-62.5764	53.5	.0849429	260.8	-.0135176	-.0838604
72	53.8242	-62.5764	58.85	.0537258	262.6	-6.94E-03	-.0532752
END	53.8242	-62.5764	64.2	0	0	0	0

Sampling System Measurements – KHJ

Impedance measurements were made of the antenna monitor sampling system using a Hewlett-Packard 8751A network analyzer and a Tunwall Radio directional coupler in a calibrated measurement system. The measurements were made looking into the antenna monitor ends of the sampling lines for two conditions – with and without them connected to the sampling loops on the towers. The measurements were made where the sampling lines connect to the filtered antenna monitor system, at the location of the co-located KBLA antenna monitor. The entire runs, including the sampling line isolation coils at the tower bases and the sections on the towers, were measured.

The following table shows two adjacent frequencies where resonance – zero reactance corresponding with low resistance – was found with the open circuited measurements. As the length of a distortionless transmission line is 180 electrical degrees at the difference frequency between adjacent frequencies of resonance, and frequencies of resonance occur at odd multiples of 90 degrees electrical length, the sampling line length at the resonant frequency below carrier frequency was found to be 90 electrical degrees and the length at the resonant frequency above carrier frequency was found to be 270 electrical degrees. As the resonant frequencies above carrier frequency are the closest to carrier frequency, in terms of their ratios to carrier frequency, the electrical lengths at carrier frequency appearing in the table below were calculated by ratioing them to carrier frequency.

Tower	Sampling Line Open-Circuited Resonance Below 930 kHz (kHz)	Sampling Line Open-Circuited Resonance Above 930 kHz (kHz)	Sampling Line Calculated Electrical Length at 930 kHz (degrees)	930 KHz Measured Impedance with Sampling Loop Connected (Ohms)
3	351.81	1067.88	235.1	9.9 +j 86.4
4	351.81	1067.88	235.1	9.9 +j 87.1
5	351.81	1067.31	235.3	10.0 +j 86.9

The sampling line lengths meet the requirement that they be equal in length within 1 electrical degree.

The characteristic impedance was calculated using the following formula, where $R_1 + j X_1$ and $R_2 + j X_2$ are the measured impedances at the +45 and –45 degree offset frequencies, respectively:

$$Zo = ((R_1^2 + X_1^2)^{1/2} \bullet (R_2^2 + X_2^2)^{1/2})^{1/2}$$

The impedances for the characteristic impedance calculations were measured at frequencies offset from the resonant frequency that is above the carrier frequency, as it is the closest to carrier frequency in terms of ratio, to give the 45 degree length differences.

Tower	-45 Degree Offset Frequency (kHz)	-45 Degree Measured Impedance (Ohms)	+45 Degree Offset Frequency (kHz)	+45 Degree Measured Impedance (Ohms)	Calculated Characteristic Impedance (Ohms)
3	889.90	3.61 –j 49.81	1245.85	5.68 +j 49.32	49.8
4	889.90	3.60 –j 49.89	1245.85	5.71 +j 49.57	50.0
5	889.43	3.64 –j 49.68	1245.20	5.75 +j 49.65	49.9

The sampling line measured characteristic impedances meet the requirement that they be equal within 2 ohms.

Reference Field Strength Measurements – KHJ

Reference field strength measurements were made at three locations along each radial at an azimuth specified for monitoring by the construction permit for the nighttime pattern, at 41.5 and 294.0 degrees true, and a major lobe radial at 173.0 degrees true. The measured field strengths, descriptions and GPS coordinates for the reference measurement points are shown on the following page.

Reference Field Strength Measurements

KHJ DA-N

Radial (Deg.)	Point	Dist. (Km)	Field (mV/m)	Coordinates (NAD 83)		Description
				N	W	
41.5	1	2.85	120	34-06-17.0	118-14-13.1	NW Corner of Carlyle and Avenue 30 at Glassell Park Elementary School
	2	3.06	112	34-06-22.5	118-14-09.1	On sidewalk opposite stairway to 2312 Avenue 31
	3	3.43	90	34-06-30.4	118-13-57.8	Driveway of 2334 Avenue 33
173	1	1.31	560	34-04-25.7	118-15-22.0	Opposite 974 W Kensington at Lavetta Terrace
	2	1.52	725	34-04-19.4	118-15-21.1	At rear of 1438 Wallace Avenue; at double garage on Ridgeway
	3	1.74	810	34-04-11.6	118-15-19.9	At driveway of 1414 Carrol Avenue
294	1	1.80	132	34-05-32.2	118-16-31.0	Driveway of 1661 Maltman
	2	1.91	110	34-05-33.9	118-16-34.6	Middle of street in front of 1667 Edgecliff
	3	2.01	102	34-05-34.8	118-16-39.1	Driveway of 1667 Lucille

All of the field strength observations were made on May 4, 2013 by Mr. Robert F. Turner. The Potomac Instruments FIM-41 field strength meter used for the measurements, serial number 1205, was checked and found to be in agreement with Potomac Instruments FIM-41 field strength meter serial number 1924 which was most recently calibrated by its manufacturer on May 21, 2012.

Direct Measurement of Power - KHJ

Common point impedance measurements were made using the permanently installed Delta Electronics CPB-1 Common Point Bridge. The bridge is located in the circuit adjacent to the common point current meter that is used to determine operating power. The bridge readings were confirmed by comparison with those made by a calibrated network analyzer measurement system employing a Hewlett-Packard 8751A vector network analyzer and a Tunwall Radio directional coupler. The common point impedance was adjusted to 50.0 + j0.0 ohms for both the daytime nondirectional antenna and the nighttime directional pattern.

The antenna system includes a matching network located between the phasor input and the common point that provides an optimum load for the transmitter. It is designed to feed a non-reactive load impedance and that is why the common point has 0.0 ohms reactance instead of the small negative reactance that is typically employed to cancel hookup and switching inductance by systems that have the transmitter input connected directly to the common point without a matching network such as is employed by the KHJ system.

Section 73.51(b)(1) of the FCC Rules specifies that the authorized antenna input power of a directional antenna for up to five kilowatts nominal power shall be increased by 8 percent above the nominal power. For the night 5,000 watt directional pattern, the common point current was calculated for 5,400 watts antenna input power.

Antenna Monitor and Sampling System - KHJ

The antenna monitor is a Potomac Instruments model AM-1901 with factory-installed filters to select the KHJ carrier frequency (930 KHz) and reject the KYPA (1230 KHz) and KBLA (1580 KHz) carrier frequencies. Single turn, unshielded sampling loops are installed at 67 feet above the base insulator on each of the 200 foot tall towers of the array to serve the antenna monitors of all three stations. The loops are connected through equal length ½ inch foam heliax sampling lines to the antenna monitor system at the location of the KBLA antenna monitor. Additional equal length sections of sampling line extend from there to the KHJ and KYPA antenna monitors and finally to a panel containing terminating resistors. All three of the antenna monitors have high impedance bridging inputs that appear across the sampling lines where they are connected and the terminating resistor panel provides matching for the transmission lines coming from the sampling loops in one place.

The complete antenna monitor system, including the three antenna monitors, interconnecting cables and terminating resistor panel, was factory calibrated by Potomac Instruments in February of 2013. Immediately thereafter, it was shipped to the transmitter site and installed.

RFR Protection - KHJ

The operation of KHJ at the site shared with KYPA and KBLA will not result in the exposure of workers or the general public to levels of radio frequency radiation in excess of the limits specified in 47 CFR 1.1310. Metal fences are in place about the tower bases to restrict access to distances beyond those necessary to prevent electric and magnetic field exposure above their required maximum levels. Equipment enclosures within the transmitter building provide effective shielding to contain the radiofrequency fields within them. The effectiveness of both have been verified by measurement.

The fences restrict access to areas with fields that exceed the requirements of the Rules with both stations operating normally at full power. If it is necessary for workers to be inside the restricted areas of the tower base area fences for extended periods of time, the stations may switch to nondirectional operation with KHJ using either tower 4 or tower 5, KYPA using either tower 2 or tower 6, and KBLA using either tower 1 or tower 5 to de-energize other towers, as needed.

Measurements were made to verify that the protection requirements are met with a Holiday Industries model HI-3002 broadband survey meter, using a model STE-02 probe for the electric field component and a model LFH-02 probe for the magnetic field component. The manufacturer's specified probe factors were applied to the meter readings. Observations were made at distances 20 centimeters or more from nearby conducting objects, following the procedures outlined in the FCC's "OET Bulletin 65, Edition 97-01."

At the KHJ and KYPA carrier frequencies, 930 kHz and 1230 KHz, the specified maximum electric and magnetic field values are 614 V/m and 1.63 A/m, respectively. At the KBLA carrier frequency, 1580 KHz, the specified maximum values are 521 V/m and 1.39 A/m. For worst-case analysis, the 1580 KHz maximum specified values were used for comparison with the measured field levels with both stations operating to determine compliance since they are lower than the values for the other two frequencies.

Measurements were made with all three stations operating at their full power levels into their authorized directional antenna systems for both daytime and nighttime modes. No field levels in excess of, or even approaching, the worst-case analysis values were found in any unrestricted areas of the transmitter site. No spatially-averaged measurements were necessary. The following were the highest observed field levels between ground and two meters above ground outside the tower base fences:

Daytime Mode RFR Measurement Results		
Tower	Maximum Measured Electric Field (V/m)	Maximum Measured Magnetic Field (A/m)
1	173	NIL
2	212	0.548
3	332	0.883
4	346	0.424
5	235	0.883
6	134	NIL

Nighttime Mode RFR Measurement Results		
Tower	Maximum Measured Electric Field (V/m)	Maximum Measured Magnetic Field (A/m)
1	387	0.548
2	360	0.735
3	292	0.548
4	255	0.379
5	265	0.812
6	141	0.346

KHJ Intermodulation Product Observations Involving KYPA and KBLA

The KHJ transmitter site is shared with stations KYPA and KBLA. Filters are employed at the tower bases to isolate the antenna system equipment of the three stations from interaction and also at the antenna system inputs to isolate the transmitters from each other's signals. The most critical purpose of the filters is to avoid the production of spurious emissions through the development of intermodulation products of the three stations' frequencies.

Upon completion of final tuning of the KHJ (930 KHz) antenna system, with both KYPA (1230 KHz) and KBLA (1580 KHz) also operating at full power with their authorized daytime antennas, a field strength meter was utilized to search for intermodulation products of the three stations operating at the transmitter site. The observations were made approximately 0.75 kilometer from the transmitter site at an azimuth of approximately 218 degrees true, a direction within the major lobes of both the KYPA and KBLA directional antenna patterns. The location is near the center of the front parking lot of the Rite Aid Pharmacy located at 1433 N Alvarado Boulevard, Los Angeles, California. It is clear of overhead wires and as clear of nearby reradiating objects as possible in the area.

Observations were made at the three stations' carrier frequencies and at all second and third order intermodulation product frequencies involving KHJ and falling within the frequency range of the field strength meter. Signals that were found to be intermodulation products that may be generated in the transmitting equipment, coming from the direction of the transmitter site and carrying the modulation of one or more of the stations, were analyzed relative to the field strengths at their component carrier frequencies. The following tabulation shows the results of the intermodulation product observations.

KHJ INTERMODULATION PRODUCT OBSERVATIONS					
Frequency (KHz)	Product of Frequencies (KHz)	Field Strength (mV/m)	Relative to KHJ (dB)	Relative to KYPA (dB)	Relative to KBLA (dB)
580	930 + 1230 - 1580	N/O	--	--	--
630	2 X 930 - 1230	N/O	--	--	--
650	930 - 1580	N/O	--	--	--
930	KHJ Carrier	1,280	0.0	N/P	N/P
1230	KYPA Carrier	670	N/P	0.0	N/P
1280	930 - 1230 + 1580	N/O	--	--	--
1530	930 - 2 X 1230	N/O	--	--	--
1580	KBLA Carrier	7,300	N/P	N/P	0.0
1880	930 - 1230 - 1580	N/O	--	--	--
2160	930 + 1230	N/O	--	--	--
2230	930 - 2 X 1580	0.075	-84.6	N/P	-99.8
2510	930 + 1580	0.110	-81.3	N/P	-96.4
3090	2 X 930 + 1230	N/O	--	--	--
3390	930 + 2 X 1230	N/O	--	--	--
3440	2 X 930 + 1580	0.052	-87.8	N/P	-102.9
3740	930 + 1230 + 1580	0.022	-95.3	-89.7	-110.4
4090	930 + 2 X 1580	0.120	-80.6	N/P	-95.7
N/O – None Observed N/P – Station frequency is not involved in this product.					

The field strength measurements were made with a Potomac Instruments FIM-41 field strength meter, serial number 1205. It was most recently calibrated by its manufacturer on May 21, 2012.

Section 73.44(b) of the FCC Rules specifies that emissions more than 75 KHz from carrier frequency must be at least 80 dB below the radiation pattern RMS carrier level of 5 kilowatt station KHJ, 73 dB below the radiation pattern RMS carrier level of 1.0 kilowatt station KYPA and 80 dB below the radiation pattern RMS carrier level of 50 kilowatt station KBLA.

As KHJ employs a nondirectional daytime antenna, it has no gain to be considered in analyzing the spurious emission observations. There is a margin of 0.6 dB with reference to the highest spurious signal that was observed at a product frequency involving KHJ with KYPA and/or KBLA, at 4090 KHz, relative to the KHJ signal.

The standard unattenuated field of the 1.0 kilowatt KYPA directional antenna pattern at 218 degrees true is 425 mV/m, while the standard unattenuated RMS of the directional antenna pattern is 333 mV/m, making the KYPA directional antenna pattern gain at 218 degrees true 2.1 dB. Following the procedure outlined in Section 73.44(d)(2) of the FCC Rules to account for directional antenna pattern gain, there is a margin of 14.6 dB with reference to the highest spurious signal that was observed at a product frequency involving KHJ and KYPA, at 3740 KHz, relative to the KYPA signal.

The standard unattenuated field of the 50 kilowatt KBLA directional antenna pattern at 218 degrees true is 5059 mV/m, while the standard unattenuated RMS of the directional antenna pattern is 2873 mV/m, making the KBLA directional antenna pattern gain at 218 degrees true 4.9 dB. Following the procedure outlined in Section 73.44(d)(2) of the FCC Rules to account for directional antenna pattern gain, there is a margin of 10.8 dB with reference to the highest spurious signal that was observed at a product frequency involving KHJ and KBLA, at 4090 KHz, relative to the KBLA signal.

The measurements indicate that the filtering equipment employed is functioning satisfactorily.

Further Clarification - KHJ Intermodulation Product Observations

The foregoing analysis is based upon intermodulation product field strength observations made in the daytime to avoid "masking" due to nighttime skywave propagation from distant transmitters. The filters that isolate the transmitters from each other to avoid the production of intermodulation products, which are located at the antenna system inputs, are used for both daytime and nighttime operation. The filters are linear, passive circuits. Demonstration of their effective operation in the daytime confirms their effectiveness at night.

Tower Numbering - KHJ

The construction permit for the new KHJ directional antenna system uses a numbering scheme for the towers that differs from that of the licensed facility of KBLA, the station that has operated at the site for many years. The KHJ construction permit shows theoretical parameters specified for towers 1, 2 and 3, which are towers 5, 3, and 4, respectively, of the KBLA array.

It is desirable for all stations at a site to use the same numbering system to avoid confusion – particularly with regard to radiofrequency radiation exposure and safety of life issues when maintenance is performed on towers. All references to tower numbering at the site – including the antenna monitors and the nomenclature of the phasing and coupling equipment – follow the scheme of the KBLA licensed specifications. KHJ will use this numbering scheme for referring to the towers in day-to-day operation.

To eliminate any confusion, it is requested that the new license have the numbering scheme that is in use at the site, with operating parameters specified for towers 5, 3 and 4. All tower numbering herein adheres to that scheme. The antenna monitor parameters provided herein and on the associated FCC Form 302 technical section correspond to the towers numbered accordingly.

Summary of Certified Array Geometry - KHJ

The tower locations based on the relative distances in feet and azimuths (referenced to True North) provided in the Tower Location Certification of Appendix A were compared to the relative distances and azimuths of the array elements specified on the construction permit. The Certified and specified values were converted to the rectangular coordinate system to facilitate calculating the individual tower specified-to-certified distances, which were then converted to the polar coordinate system to determine their magnitudes. The following tabulation shows those distances, expressed in feet and electrical degrees at 930 kilohertz, as well as other information that is relevant to their determination.

Tower	Specified Array Geometry			Post-Construction Certification*		Distance From Specified Base Location	
	Spacing (Deg.)	Spacing (Feet)	Azimuth (Deg. T.)	Spacing (Feet)	Azimuth (Deg. T.)	(Feet)	(Deg.)
1	Ref.	Ref.	Ref.	Ref.	Ref.	Ref.	Ref.
2	75.7	222.4	343.5	222.5	343.5	0.1	0.03
3	47.1	138.4	200.0	138.6	200.0	0.2	0.07

The maximum "as built" tower displacement from the specified location expressed in electrical degrees at carrier frequency is within the 1.5 electrical degree tolerance specified in FCC Public Notice DA 09-2340, October 29, 2009.

The tower number designations for this analysis agree with those shown on the construction permit document for direct comparison. Towers 1, 2 and 3 of the construction permit are towers 5, 3 and 4 of the six-tower KBLA array, respectively, and they appear by that numbering scheme throughout the remainder of this exhibit. See Item 11.

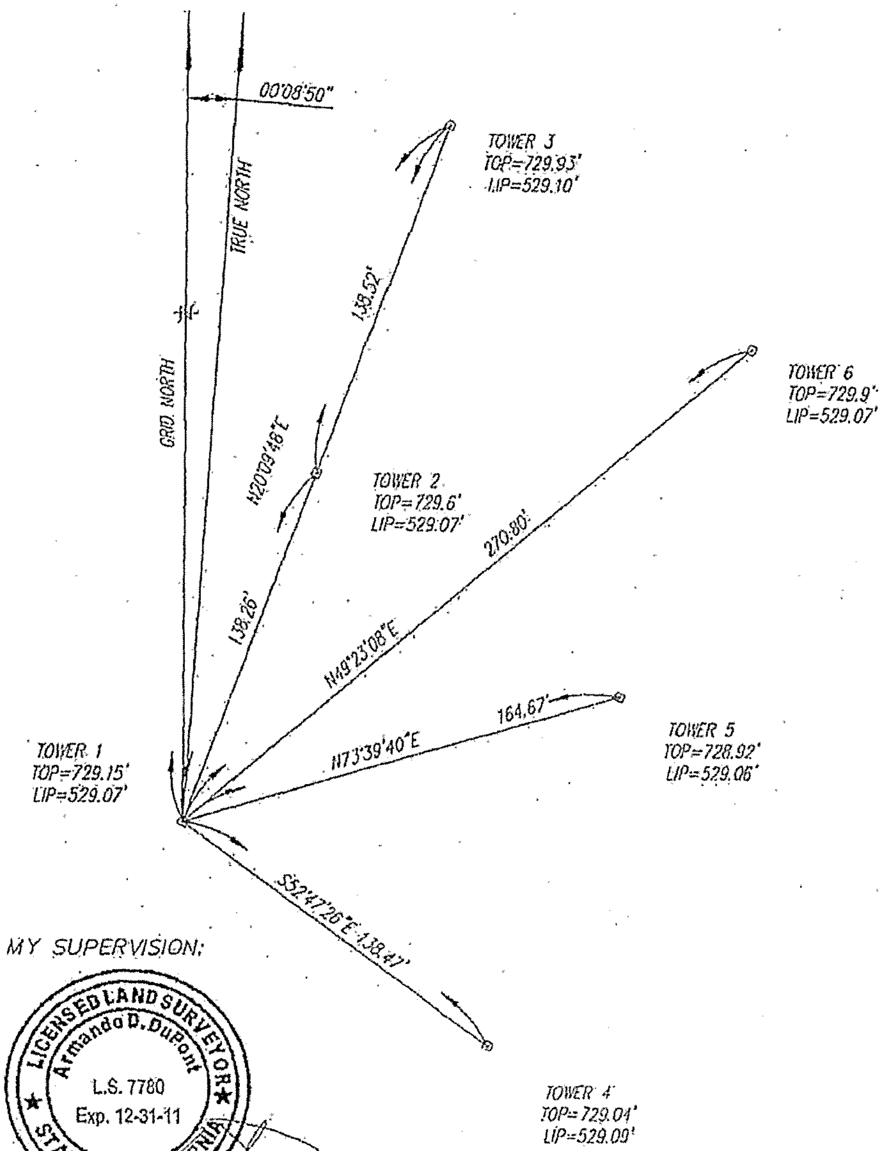
As built tower locations derived from October 18, 2011 Tower Location Certification prepared by Armando D. Dupont, Professional Land Surveyor of Cal Vada Surveying, Inc.

Appendix A

Certified Post Construction Array Geometry

EXHIBIT "A-1"

KBLA-AM TRANSMITTING TOWERS
1700 N. ALVARADO, LOS ANGELES, CA



PREPARED UNDER MY SUPERVISION:

LICENSED LAND SURVEYOR ★ Armando D. DuPont ★ L.S. 7780 Exp. 12-31-11 STATE OF CALIFORNIA

ARMANDO D. DUPONT,
P.L.S. 7780
REG. EXP. DECEMBER 31, 2011

SHEET 1 OF 2

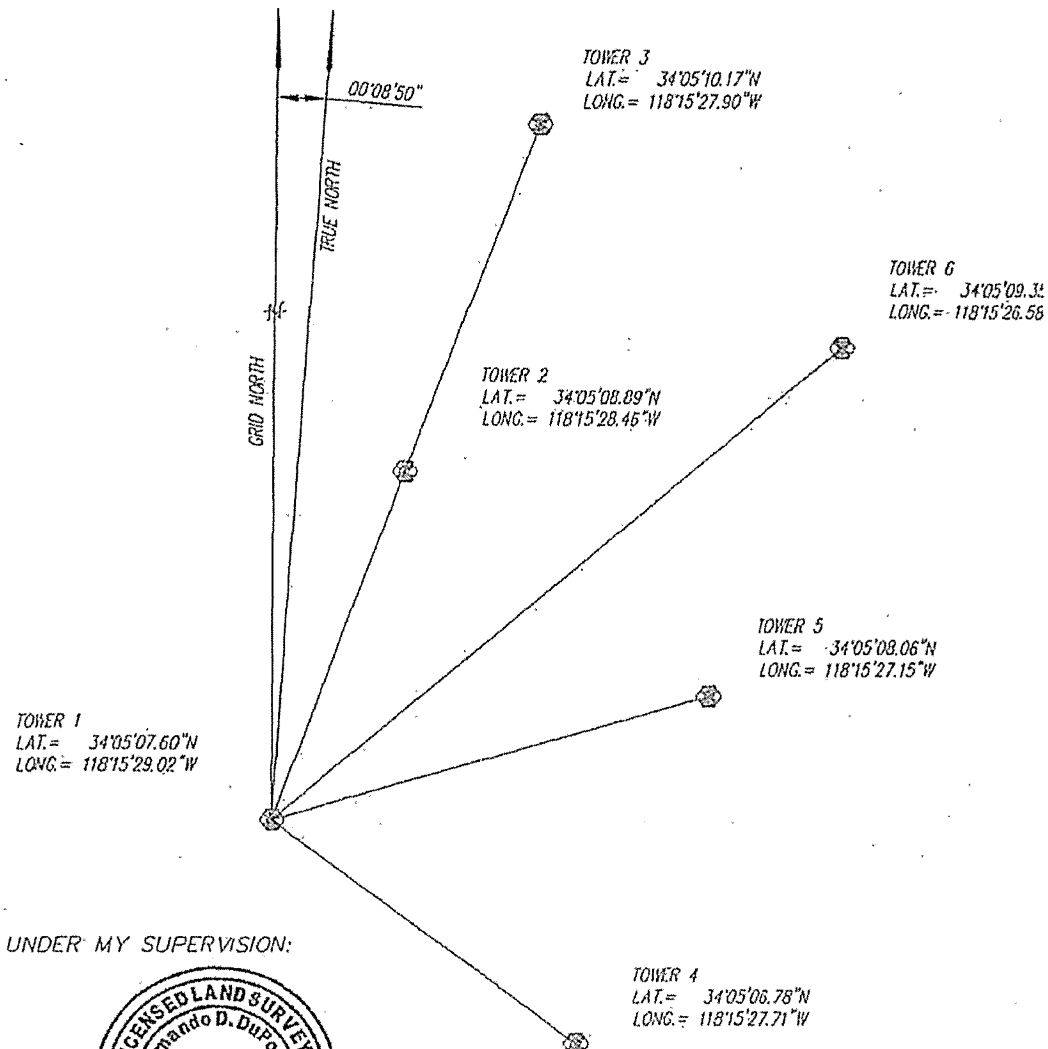
SURVEY DATE: 10/11/11

CALVADA
SURVEYING, INC.
411 JENKS CIRCLE, SUITE 205, CORONA, CA. 92880-1782 PHONE: 951-280-9960 FAX: 951-280-9746 www.calvada.com

Job No. 11837
Drawn By: GBM
Date: 10/18/11

EXHIBIT "A-2"

KBLA-AM TRANSMITTING TOWERS
1700 N. ALVARADO, LOS ANGELES, CA



PREPARED UNDER MY SUPERVISION:

LICENSED LAND SURVEYOR
Armando D. DuPont
L.S. 7780
Exp. 12-31-11
STATE OF CALIFORNIA

ARMANDO D. DUPONT,
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SHEET 2 OF 2

SURVEY DATE: 10/11/11

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