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FILED/ACCEPTED

MAR 26 2013

Federal Communications Commission
Washington, D. C. 20554

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

FOR FCC USE ONLY

Federal Communications Commission
Office of the Secretary

0019362953

SMC 3/28/13

FCC 302-AM
APPLICATION FOR AM BROADCAST STATION LICENSE

(Please read instructions before filling out form.

FOR COMMISSION USE ONLY
FILE NO. BMML-20130326BDU

SECTION I - APPLICANT FEE INFORMATION

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

Capstar TX LLC

MAILING ADDRESS (Line 1) (Maximum 35 characters)
2625 S. Memorial

MAILING ADDRESS (Line 2) (Maximum 35 characters)
Suite A

CITY	STATE OR COUNTRY (if foreign address)	ZIP CODE
Tulsa	OK	74129

TELEPHONE NUMBER (include area code)	CALL LETTERS	OTHER FCC IDENTIFIER (If applicable)
9186644581	KOGA	Facility ID: 50065

2. A. Is a fee submitted with this application? ☑ 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
MMR	0001	$ 635.00	

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
MOR	0001	$ 730.00	

	TOTAL AMOUNT REMITTED WITH THIS APPLICATION	FOR FCC USE ONLY
ADD ALL AMOUNTS SHOWN IN COLUMN C, AND ENTER THE TOTAL HERE. THIS AMOUNT SHOULD EQUAL YOUR ENCLOSED REMITTANCE.	$ 1365.00	

SECTION II - APPLICANT INFORMATION		
1. NAME OF APPLICANT Capstar TX LLC		
MAILING ADDRESS 2625 S. Memorial Dr, Suite A		
CITY Tulsa	STATE OK	ZIP CODE 7419

2. This application is for:

☑ Commercial ☐ Noncommercial

☑ AM Directional ☐ AM Non-Directional

Call letters	Community of License	Construction Permit File No.	Modification of Construction Permit File No(s).	Expiration Date of Last Construction Permit
KOGA	Ogallala, NE	BMP-20120706ABK	BP-20091215AAE	04/01/13

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.

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.

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.

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.

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.

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.

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	
Stephen G. Davis		
Title	Date	Telephone Number
Senior Vice President	3/26/12	9186644581

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
Capstar TX 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	Day
KOGA	BMP-20120706ABK	930	Unlimited	0.5	2.1

2. Station location	
State	City or Town
Nebraska	Ogallala

3. Transmitter location			
State	County	City or Town	Street address (or other identification)
NE	Keith	Ogallala	99 Prairie Ridge Road

4. Main studio location			
State	County	City or Town	Street address (or other identification)
NE	Keith	Ogallala	113 West 4th St.

5. Remote control point location (specify only if authorized directional antenna)			
State	County	City or Town	Street address (or other identification)
NE	Keith	Ogallala	113 West 4th St.

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.

8. Operating constants:	
RF common point or antenna current (in amperes) without modulation for night system 3.28 A	RF common point or antenna current (in amperes) without modulation for day system 6.48 A
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 -j7 Day -j7

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
Twr 1 ASRN: 1026728	-60.1	---	0.902	----		
Twr 2 ASRN: 1026730	0.00	---	1.0	----		
Twr 3 ASRN: 1026729	10.0	---	0.764	----		

Manufacturer and type of antenna monitor: Potomac Instruments AM-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.
Uniform cross section, guyed	See Exhibit Appendix B	See Exhibit Appendix B	See Exhibit Appendix B	Exhibit No.

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	West Longitude
41 ° 08 ' 33 "	101 ° 42 ' 48 "

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. See Appendix A

Also, if necessary for a complete description, attach as an Exhibit a sketch of the details and dimensions of ground system. Exhibit No. See Exhibit Item 8

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

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

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)
Allan Brace	
Address (include ZIP Code) 2625 S. Memorial Suite A Tulsa, OK 74129	Date 3/25/13 Telephone No. (Include Area Code) 9186644581

☑ Technical Director ☐ Registered Professional Engineer

☐ Chief Operator ☐ Technical Consultant

☐ Other (specify)

APPLICATION FOR LICENSE INFORMATION

RADIO STATION KOGA

CAPSTAR TX LLC

OGALLALA, NEBRASKA

FID 50065

930 KHZ 2.1KW NDD, .5KW DAN

MARCH 20, 2013

APPLICATION FOR LICENSE INFORMATION
RADIO STATION KOGA
OGALLALA, NEBRASKA

930 KHZ 2.1 KW NDD, .5 KW DAN

Table of Contents

EXECUTIVE SUMMARY

This engineering exhibit has been prepared in support of an application for license for non-directional daytime operation of KOGA as authorized by construction permit BMP20120706ABK which was granted on September 28, 2012. The details of the construction are provided on Form 302 to which this report is attached.

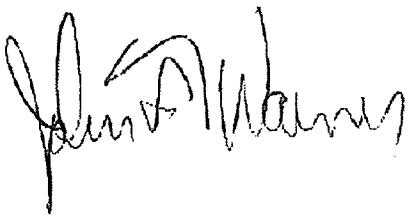
The nighttime array continues to operate as previously licensed, however, measurements are included to relicense the nighttime operation under Rule Section 73.151c. The towers and ground system of the currently licensed nighttime array remain as currently described. A fourth tower that, in addition to the three towers in the nighttime array, made up the daytime directional array has been removed. Non-directional daytime operation utilizes tower one (#1) of the nighttime array. The remaining nighttime towers float during non-directional daytime operation.

The system has been adjusted to produce nighttime directional antenna parameters within+/-5% in ratio and +/-3 degrees in phase of the modeled values as prescribed in the Rules.

It should be noted that the construction permit as well as the Commission's database reference the magnitude of the night array reference field as a value of .97 as opposed to the traditional value of 1.0. Current moment sums for the model described in this report normalize to the theoretical patterns parameters if the value of .97 is used as reference.

All measurements contained in this report were made by Mr. Jacob Wyatt of the Clear Channel Corporate Engineering Staff or the undersigned.

Please refer any questions regarding this report to:



John F. Warner
johnwarner@clearchannel.com
443-255-5299

Analysis of Tower Impedance Measurements to Verify Method of Moments Model

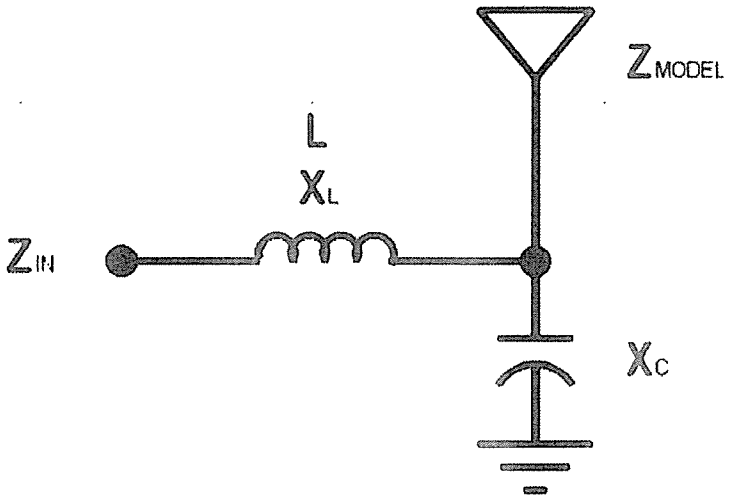
Impedance measurements were made of the individual towers with the other tower bases open. Measurements were made using a Hewlett-Packard 4396A network analyzer and a Tunwall Radio directional coupler in a calibrated measurement system. Measurements were made immediately adjacent to the torroidal antenna sampling transformers, inside the antenna coupling units. These measured values were related to the modeled values obtained using Expert MININEC Broadcast Professional V14.6. Heights of the towers were adjusted as permitted by Rule Section 73.151(c)(1).

The tower radii were modeled at their actual values. The towers were segmented so that each segment is less than ten (10) degrees in length.

Tower	Actual Height Degrees	Model Height Degrees	Model Percent of Height	Model Equivalent Radius Meters	Model Percent Of Radius
1	83.4	85.5	102.5	.2182	100
2	102.1	106.0	103.8	.2182	100
3	85.1	88.9	104.5	.2182	100

Method of Moments Model Details for Towers Driven Individually

The model was verified by comparison of modeled to measured tower impedances. The tower resistance and reactance were measured immediately adjacent to the torroidal base sampling transformers, inside the antenna tuning unit cabinets. The measured and modeled impedances were correlated using the Westberg Consulting WCAP Pro software program. WCAP is based on the SPICE nodal analysis program. The shunt capacitive reactance of the tower base insulator is represented in the drawing below as Xc. The series inductive reactance of the tower feed conductor is represented as Xl. Z model represents the modeled impedance of the tower and Zin represents the impedance measured at the sampling point. In the following WCAP tabulations, the modeled impedance is represented between nodes 3-0. The measured impedance is represented between nodes 1-3. Node 0 represents ground. The calculated reference point impedances appear under the "TO NODE IMPEDANCE" columns of the WCAP calculations, 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 in series with the drive current sources (I0-1) to provide calculation points for the impedances.



Tower	L (uh)	Xl (+j)	Xc (-j)	Z Modeled	Z in Modeled	Z in Measured
1	7.9	46.2	-2282	35.7 –j3.8	35.6 +j41.8	35.7 +j41.6
2	2.1	12.3	-6845	78.7 +j118.1	81.5 +j131.5	80.9 +j130.5
3	4.5	26.3	-6845	40.7 +j14.1	40.9 +j40.3	40.3 +j40.5

WCAP – **KOGA Tower 1 Driven, others open**

WCAP OUTPUT AT FREQUENCY: 0.930 MHz

NODE VOLTAGES
Node: 1 5555.0977 ∠ 48.8249° V
Node: 2 3583.7610 ∠ -6.9707° V
Node: 3 5489.7774 ∠ 49.6105° V

WCAP PART		CURRENT IN	CURRENT OUT

WCAP PART			BRANCH VOLTAGE	BRANCH CURRENT
R	2→0	35.70000000	3583.76 ∠ -6.971° V	99.82 ∠ -0.895° A
C	2→0	0.00007500	3583.76 ∠ -6.971° V	1.57 ∠ 83.029° A
R	1→3	1.00000000	100.00 ∠ 0.000° V	100.00 ∠ 0.000° A
L	3→2	7.90000000	4616.26 ∠ 90.000° V	100.00 ∠ 0.001° A

WCAP PART			FROM IMPEDANCE	TO IMPEDANCE
R	2→0	35.70000000	35.70 - j 3.800	0.00 + j 0.000
C	2→0	0.00007500	0.00 - j 2281.791	0.00 + j 0.000
R	1→3	1.00000000	36.57 + j 41.813	**35.57 + j 41.813**
L	3→2	7.90000000	35.57 + j 41.813	35.57 - j 4.349

WCAP PART	VSWR

WCAP INPUT DATA:

	0.9300	0.00000000	0	
R	35.70000000	2	0	-3.80000000
C	0.00007500	2	0	
R	1.00000000	1	3	0.00000000
L	7.90000000	3	2	0.00000000
I	100.00000000	0	1	0.00000000

WCAP – **KOGA Tower 2 driven, others open**

WCAP OUTPUT AT FREQUENCY: 0.930 MHz

NODE VOLTAGES
Node: 1 15521.6872 ∠ 57.9025° V
Node: 2 14440.1631 ∠ 55.6509° V
Node: 3 15468.7830 ∠ 58.2163° V

WCAP PART	CURRENT IN	CURRENT OUT

	WCAP PART		BRANCH VOLTAGE	BRANCH CURRENT
R	2→0	78.70000000	14440.16 ∠ 55.651° V	101.75 ∠ -0.670° A
C	2→0	0.00002500	14440.16 ∠ 55.651° V	2.11 ∠ 145.651° A
R	1→3	1.00000000	100.00 ∠ 0.000° V	100.00 ∠ 0.000° A
L	3→2	2.10000000	1227.11 ∠ 90.000° V	100.00 ∠ -0.000° A

	WCAP PART		FROM IMPEDANCE	TO IMPEDANCE
R	2→0	78.70000000	78.70 + j 118.100	0.00 + j 0.000
C	2→0	0.00002500	-0.01 - j 6845.374	0.00 + j 0.000
R	1→3	1.00000000	82.48 + j 131.491	**81.48 + j 131.491**
L	3→2	2.10000000	81.48 + j 131.491	81.48 + j 119.220

WCAP PART	VSWR

WCAP INPUT DATA:

	0.9300	0.00000000	0	
R	78.70000000	2	0	118.10000000
C	0.00002500	2	0	
R	1.00000000	1	3	0.00000000
L	2.10000000	3	2	0.00000000
I	100.00000000	0	1	0.00000000

WCAP- **KOGA Tower 3 driven, others open**

WCAP OUTPUT AT FREQUENCY: 0.930 MHz

NODE VOLTAGES
Node: 1 5809.9014 ∠ 43.8934° V
Node: 2 4319.4870 ∠ 18.8922° V
Node: 3 5738.2572 ∠ 44.5857° V

WCAP PART	CURRENT IN	CURRENT OUT

	WCAP PART		BRANCH VOLTAGE		BRANCH CURRENT	
R	2→0	40.70000000	4319.49 ∠	18.892° V	100.21 ∠	-0.341° A
C	2→0	0.00002500	4319.49 ∠	18.892° V	0.63 ∠	108.892° A
R	1→3	1.00000000	100.00 ∠	0.000° V	100.00 ∠	0.000° A
L	3→2	4.50000000	2629.51 ∠	90.000° V	100.00 ∠	-0.000° A

	WCAP PART		FROM IMPEDANCE		TO IMPEDANCE	
R	2→0	40.70000000	40.70 + j	14.200	0.00 + j	0.000
C	2→0	0.00002500	-0.00 - j	6845.374	0.00 + j	0.000
R	1→3	1.00000000	41.87 + j	40.281	**40.87 + j**	**40.281**
L	3→2	4.50000000	40.87 + j	40.281	40.87 + j	13.986

WCAP PART	VSWR

WCAP INPUT DATA:

	0.9300	0.00000000	0	
R	40.70000000	2	0	14.20000000
C	0.00002500	2	0	
R	1.00000000	1	3	0.00000000
L	4.50000000	3	2	0.00000000
I	100.00000000	0	1	0.00000000

Tower 1 driven, others open

IMPEDANCE
normalization = 50.

freq (MHz)	resist (ohms)	react (ohms)	imped (ohms)	phase (deg)	VSWR	S11 dB	S12 dB
source = 1; node 1, sector 1							
.93	35.722	-3.7554	35.918	354.	1.4157	-15.286	-.13052

GEOMETRY
Wire coordinates in degrees; other dimensions in meters
Environment: perfect ground

wire	caps	Distance	Angle	Z	radius	segs
1	none	0	0	0	.2182	15
		0	0	85.5		
2	none	171.4	98.	0	.2182	15
		171.4	98.	106.		
3	none	374.	98.	0	.2182	15
		374.	98.	88.9		

Number of wires = 3
current nodes = 45

	minimum		maximum	
Individual wires	wire	value	wire	value
segment length	1	5.7	2	7.06667
radius	1	.2182	1	.2182

ELECTRICAL DESCRIPTION
Frequencies (MHz)

	frequency		no. of	segment length (wavelengths)	
no.	lowest	step	steps	minimum	maximum
1	.93	0	1	.0158333	.0196296

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	16	0	-6,845.	0	0	0
2	31	0	-6,845.	0	0	0

Tower 2 driven, others open

IMPEDANCE
normalization = 50.

freq (MHz)	resist (ohms)	react (ohms)	imped (ohms)	phase (deg)	VSWR	S11 dB	S12 dB
source = 1; node 16, sector 1							
.93	78.745	118.1	141.94	56.3	5.5727	-3.1514	-2.8736

GEOMETRY
Wire coordinates in degrees; other dimensions in meters
Environment: perfect ground

wire	caps	Distance	Angle	Z	radius	segs
1	none	0	0	0	.2182	15
		0	0	85.5		
2	none	171.4	98.	0	.2182	15
		171.4	98.	106.		
3	none	374.	98.	0	.2182	15
		374.	98.	88.9		

Number of wires = 3
current nodes = 45

	minimum		maximum	
Individual wires	wire	value	wire	value
segment length	1	5.7	2	7.06667
radius	1	.2182	1	.2182

ELECTRICAL DESCRIPTION
Frequencies (MHz)

	frequency		no. of	segment length (wavelengths)	
no.	lowest	step	steps	minimum	maximum
1	.93	0	1	.0158333	.0196296

Sources

source	node	sector	magnitude	phase	type
1	16	1	1.	0	voltage

Lumped loads

passive load	node	resistance (ohms)	reactance (ohms)	inductance (mH)	capacitance (uF)	circuit
1	31	0	-6,845.	0	0	0
2	1	0	-2,282.	0	0	0

Tower 3 driven, others open

IMPEDANCE
normalization = 50.

freq (MHz)	resist (ohms)	react (ohms)	imped (ohms)	phase (deg)	VSWR	S11 dB	S12 dB
source = 1; node 31, sector 1							
.93	40.683	14.178	43.082	19.2	1.4535	-14.664	-.15098

GEOMETRY
Wire coordinates in degrees; other dimensions in meters
Environment: perfect ground

wire	caps	Distance	Angle	Z	radius	segs
1	none	0	0	0	.2182	15
		0	0	85.5		
2	none	171.4	98.	0	.2182	15
		171.4	98.	106.		
3	none	374.	98.	0	.2182	15
		374.	98.	88.9		

Number of wires = 3
current nodes = 45

	minimum		maximum	
Individual wires	wire	value	wire	value
segment length	1	5.7	2	7.06667
radius	1	.2182	1	.2182

ELECTRICAL DESCRIPTION
Frequencies (MHz)

	frequency		no. of	segment length (wavelengths)	
no.	lowest	step	steps	minimum	maximum
1	.93	0	1	.0158333	.0196296

Sources

source	node	sector	magnitude	phase	type
1	31	1	1.	0	voltage

Lumped loads

load	node	resistance (ohms)	reactance (ohms)	inductance (mH)	capacitance (uF)	passive circuit
1	1	0	-2,282.	0	0	0
2	16	0	-6,845.	0	0	0

CURRENT NODES

wire	coordinates (degrees) X	Y	Z	connections end1	end2	node no.
1	0	0	0	GND	1	1
1	0	0	5.7	1	1	2
1	0	0	11.4	1	1	3
1	0	0	17.1	1	1	4
1	0	0	22.8	1	1	5
1	0	0	28.5	1	1	6
1	0	0	34.2	1	1	7
1	0	0	39.9	1	1	8
1	0	0	45.6	1	1	9
1	0	0	51.3	1	1	10
1	0	0	57.	1	1	11
1	0	0	62.7	1	1	12
1	0	0	68.4	1	1	13
1	0	0	74.1	1	1	14
1	0	0	79.8	1	END	15
2	-23.8543	-169.732	0	GND	2	16
2	-23.8543	-169.732	7.06667	2	2	17
2	-23.8543	-169.732	14.1333	2	2	18
2	-23.8543	-169.732	21.2	2	2	19
2	-23.8543	-169.732	28.2667	2	2	20
2	-23.8543	-169.732	35.3333	2	2	21
2	-23.8543	-169.732	42.4	2	2	22
2	-23.8543	-169.732	49.4667	2	2	23
2	-23.8543	-169.732	56.5333	2	2	24
2	-23.8543	-169.732	63.6	2	2	25
2	-23.8543	-169.732	70.6667	2	2	26
2	-23.8543	-169.732	77.7333	2	2	27
2	-23.8543	-169.732	84.8	2	2	28
2	-23.8543	-169.732	91.8667	2	2	29
2	-23.8543	-169.732	98.9333	2	END	30
3	-52.0508	-370.36	0	GND	3	31
3	-52.0508	-370.36	5.92667	3	3	32
3	-52.0508	-370.36	11.8533	3	3	33
3	-52.0508	-370.36	17.78	3	3	34
3	-52.0508	-370.36	23.7067	3	3	35
3	-52.0508	-370.36	29.6333	3	3	36
3	-52.0508	-370.36	35.56	3	3	37
3	-52.0508	-370.36	41.4867	3	3	38
3	-52.0508	-370.36	47.4133	3	3	39
3	-52.0508	-370.36	53.34	3	3	40
3	-52.0508	-370.36	59.2667	3	3	41
3	-52.0508	-370.36	65.1933	3	3	42
3	-52.0508	-370.36	71.12	3	3	43
3	-52.0508	-370.36	77.0467	3	3	44
3	-52.0508	-370.36	82.9733	3	END	45

Derivation of Operating Parameters, Nighttime Directional Array

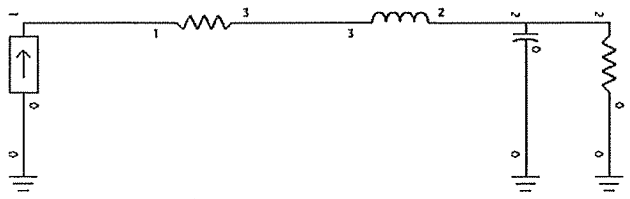
Following verification of the moment method model of the individual array elements, by comparison of the measured and modeled base impedances, directional antenna array base parameters were calculated. Calculations were made to determine the complex voltage sources which when applied to the base of each array element produce current moment sums which when normalized, equate to the theoretical field parameters of the authorized directional pattern. Using these voltages, the tower currents were calculated. The currents at the ATU sampling points were related to those of the moment method model by using the WCAP Pro nodal analysis program from Westberg Consulting. The assumptions that were used for the single tower calculations were used in the directional array case as well. In the following WCAP calculations node 1 represents the reference point, node 2 represents the tower feedpoint, and node 0 represents ground. The tower operating impedance is represented from node 2 to ground ((R 2-0). The current magnitude and phases at the sample point are represented across the phantom one (1) ohm resistor which was added to facilitate calculation. The value shown at R 1-3 has been rounded by the program. The actual current values shown as "I" in the "WCAP INPUT DATA" represent the values before rounding and were used in the calculation of antenna monitor amplitude and phase indications to yield greater accuracy.

In so much as the sample lines are equal in length and the sample torroids responses are identical, the antenna monitor amplitudes and phases have been calculated directly from the reference point currents and phases.

The antenna monitor reference is Tower #2.

Tower	Model Pulse	Model Current Magnitude At Torroid, Amps	Model Current Phase at Torroid, Degrees	Modeled Antenna Monitor Ratio	Modeled Antenna Monitor Phase, Degrees
1	1	2.04174	+326.75	..902	-60.1
2	16	2.26434	+26.811	1.000	0.00
3	31	1.72967	+36.798	.764	+10.0

WCAP Circuit Diagram



Base Model Tower #1, Night Array

WCAP Base Region Calculations

WCAP OUTPUT AT FREQUENCY: 0.930 MHz

NODE VOLTAGES

Node: 1 108.4636 ∠ -4.0688° V

Node: 2 101.4712 ∠ -57.3093° V

Node: 3 106.6856 ∠ -3.5341° V

	WCAP PART		CURRENT IN	CURRENT OUT

	WCAP PART		BRANCH VOLTAGE	BRANCH CURRENT
R	2→0	46.17900000	101.47 ∠ -57.309° V	2.02 ∠ -34.400° A
C	2→0	0.00007500	101.47 ∠ -57.309° V	0.04 ∠ 32.691° A
R	1→3	1.00000000	2.04 ∠ -33.250° V	**2.04 ∠ -33.250° A**
L	3→2	7.90000000	94.25 ∠ 56.750° V	2.04 ∠ -33.250° A

	WCAP PART		FROM IMPEDANCE	TO IMPEDANCE
R	2→0	46.17900000	46.18 - j 19.516	0.00 + j 0.000
C	2→0	0.00007500	0.00 - j 2281.791	0.00 + j 0.000
R	1→3	1.00000000	46.38 + j 25.901	45.38 + j 25.901
L	3→2	7.90000000	45.38 + j 25.901	45.38 - j 20.261

WCAP PART VSWR

WCAP INPUT DATA:

	0.9300	0.00000000	0	
R	46.17900000	2	0	-19.51600000
C	0.00007500	2	0	
R	1.00000000	1	3	0.00000000
L	7.90000000	3	2	0.00000000
I	**2.04174000**	**0**	**1**	**326.75000000**

Base Model Tower #2, Night Array

WCAP Base Region Calculations

WCAP OUTPUT AT FREQUENCY: 0.930 MHz

NODE VOLTAGES

Node: 1 292.3251 ∠ 93.5901° V

Node: 2 266.0454 ∠ 91.6786° V

Node: 3 291.4397 ∠ 93.9992° V

	WCAP PART		CURRENT IN	CURRENT OUT
	WCAP PART		BRANCH VOLTAGE	BRANCH CURRENT
R	2→0	48.38300000	266.05 ∠ 91.679° V	2.30 ∠ 26.400° A
C	2→0	0.00002500	266.05 ∠ 91.679° V	0.04 ∠ -178.321° A
R	1→3	1.00000000	2.26 ∠ 26.811° V	**2.26 ∠ 26.811° A**
L	3→2	2.10000000	27.79 ∠ 116.811° V	2.26 ∠ 26.811° A

	WCAP PART		FROM IMPEDANCE	TO IMPEDANCE
R	2→0	48.38300000	48.38 + j 105.090	0.00 + j 0.000
C	2→0	0.00002500	0.00 - j 6845.374	0.00 + j 0.000
R	1→3	1.00000000	50.90 + j 118.641	49.90 + j 118.641
L	3→2	2.10000000	49.90 + j 118.641	49.90 + j 106.370

WCAP PART	VSWR

WCAP INPUT DATA:

0.9300 0.00000000 0

R	48.38300000	2	0	105.09000000
C	0.00002500	2	0	
R	1.00000000	1	3	0.00000000
L	2.10000000	3	2	0.00000000
I	**2.26434000**	**0**	**1**	**26.81100000**

Base Model Tower #3, Night Array

WCAP Base Region Calculations

```
WCAP OUTPUT AT FREQUENCY: 0.930 MHz

NODE VOLTAGES
Node:   1     60.1167 ∠   81.5705° V
Node:   2     41.0681 ∠   32.4101° V
Node:   3     58.9014 ∠   82.7556° V

    WCAP PART                    CURRENT IN              CURRENT OUT

    WCAP PART                    BRANCH VOLTAGE          BRANCH CURRENT
R    2→0       23.68600000     41.07 ∠    32.410° V     1.73 ∠    36.600° A
C    2→0        0.00002500     41.07 ∠    32.410° V     0.01 ∠   122.410° A
R    1→3        1.00000000      1.73 ∠    36.798° V     1.73 ∠    36.798° A
L    3→2        4.50000000     45.48 ∠   126.798° V     1.73 ∠    36.798° A

    WCAP PART                    FROM IMPEDANCE          TO IMPEDANCE
R    2→0       23.68600000     23.69 - j     1.735     0.00 + j     0.000
C    2→0        0.00002500      0.00 - j  6845.374     0.00 + j     0.000
R    1→3        1.00000000     24.67 + j    24.479    23.67 + j    24.479
L    3→2        4.50000000     23.67 + j    24.479    23.67 - j     1.817

    WCAP PART                VSWR

WCAP INPUT DATA:

      0.9300      0.00000000   0

R       23.68600000   2   0     -1.73510000
C        0.00002500   2   0
R        1.00000000   1   3      0.00000000
L        4.50000000   3   2      0.00000000
I        1.72967000   0   1     36.79800000
```

MEDIUM WAVE ARRAY SYNTHESIS FROM FIELD RATIOS

Frequency = .93 MHz

tower	field ratio magnitude	phase (deg)
1	.56	321.
2	.97	22.
3	.51	34.2

VOLTAGES AND CURRENTS - rms

source node	voltage magnitude	phase (deg)	current magnitude	phase (deg)
1	101.469	302.7	2.02397	325.6
16	263.251	93.	2.29967	26.4
31	41.0672	32.4	1.72914	36.6

Sum of square of source currents = 24.7498
Total power = 500. watts

TOWER ADMITTANCE MATRIX

admittance	real (mhos)	imaginary (mhos)
Y(1, 1)	.0274069	.00671193
Y(1, 2)	.0038775	.00129994
Y(1, 3)	-.00245526	-.00341322
Y(2, 1)	.00387765	.00129951
Y(2, 2)	.00474407	-.00622621
Y(2, 3)	.00272712	-.00323174
Y(3, 1)	-.00245525	-.00341325
Y(3, 2)	.00272738	-.00323154
Y(3, 3)	.0238335	-.00801778

TOWER IMPEDANCE MATRIX

impedance	real (ohms)	imaginary (ohms)
Z(1, 1)	35.6397	-3.80791
Z(1, 2)	-10.7851	-21.2567
Z(1, 3)	5.76885	7.62263
Z(2, 1)	-10.7828	-21.2578
Z(2, 2)	78.4718	117.982
Z(2, 3)	-18.7074	-12.8889
Z(3, 1)	5.7688	7.62267
Z(3, 2)	-18.7084	-12.8875
Z(3, 3)	40.5722	14.1984

IMPEDANCE
normalization = 50.

Freq (MHz)	resist (ohms)	react (ohms)	imped (ohms)	phase (deg)	VSWR	S11 dB	S12 dB
source = 1; node 1, sector 1							
.93	46.179	-19.516	50.133	337.1	1.5083	-13.866	-.18209
source = 2; node 16, sector 1							
.93	45.383	105.09	114.47	66.6	6.728	-2.6013	-3.4619
source = 3; node 31, sector 1							
.93	23.686	-1.7351	23.75	355.8	2.1142	-8.9277	-.59486

CURRENT rms
Frequency = .93 MHz
Input power = 500. watts
Efficiency = 100. %
coordinates in degrees

no.	X	Y	Z	mag current (amps)	phase (deg)	real (amps)	imaginary (amps)
GND	0	0	0	2.02398	325.6	1.67061	-1.14261
2	0	0	5.7	1.99286	324.1	1.61531	-1.16716
3	0	0	11.4	1.95029	323.2	1.56092	-1.16926
4	0	0	17.1	1.89139	322.3	1.49718	-1.15577
5	0	0	22.8	1.81577	321.6	1.42305	-1.12781
6	0	0	28.5	1.72364	320.9	1.33846	-1.08603
7	0	0	34.2	1.61549	320.3	1.24372	-1.031
8	0	0	39.9	1.49199	319.8	1.13936	-.963277
9	0	0	45.6	1.35395	319.3	1.026	-.883459
10	0	0	51.3	1.20222	318.8	.904333	-.792165
11	0	0	57.	1.03769	318.3	.77506	-.689994
12	0	0	62.7	.861142	317.9	.638803	-.577492
13	0	0	68.4	.67302	317.5	.49594	-.454972
14	0	0	74.1	.472936	317.1	.346238	-.322162
15	0	0	79.8	.258033	316.7	.187687	-.177072
END	0	0	85.5	0	0	0	0
GND	-23.8543	-169.732	0	2.29967	26.4	2.06024	1.02171
17	-23.8543	-169.732	7.06667	2.44223	24.8	2.21671	1.02502
18	-23.8543	-169.732	14.1333	2.50682	23.9	2.29248	1.01423
19	-23.8543	-169.732	21.2	2.52473	23.1	2.32195	.991349
20	-23.8543	-169.732	28.2667	2.50051	22.5	2.31015	.956942
21	-23.8543	-169.732	35.3333	2.4365	22.	2.25955	.91156
22	-23.8543	-169.732	42.4	2.33454	21.5	2.17202	.855811
23	-23.8543	-169.732	49.4667	2.19652	21.1	2.04937	.790418
24	-23.8543	-169.732	56.5333	2.0245	20.7	1.89359	.716179
25	-23.8543	-169.732	63.6	1.82076	20.4	1.70683	.633954
26	-23.8543	-169.732	70.6667	1.58773	20.1	1.49139	.544643
27	-23.8543	-169.732	77.7333	1.32783	19.8	1.24956	.449123
28	-23.8543	-169.732	84.8	1.04318	19.5	.983373	.348148
29	-23.8543	-169.732	91.8667	.734764	19.2	.69374	.242082
30	-23.8543	-169.732	98.9333	.399924	19.	.378164	.13012
END	-23.8543	-169.732	106.	0	0	0	0
GND	-52.0508	-370.36	0	1.72915	36.6	1.38851	1.03053
32	-52.0508	-370.36	5.92667	1.71892	35.8	1.39397	1.00575
33	-52.0508	-370.36	11.8533	1.69213	35.3	1.38099	.977844
34	-52.0508	-370.36	17.78	1.64856	34.9	1.35246	.942658
35	-52.0508	-370.36	23.7067	1.58852	34.5	1.30907	.89985
36	-52.0508	-370.36	29.6333	1.51248	34.2	1.25136	.849525
37	-52.0508	-370.36	35.56	1.42106	33.9	1.17992	.79196
38	-52.0508	-370.36	41.4867	1.31501	33.6	1.09541	.727549
39	-52.0508	-370.36	47.4133	1.19517	33.3	.998555	.656757
40	-52.0508	-370.36	53.34	1.06245	33.1	.89012	.580077
41	-52.0508	-370.36	59.2667	.917758	32.9	.770881	.498018
42	-52.0508	-370.36	65.1933	.761912	32.6	.641529	.411035
43	-52.0508	-370.36	71.12	.595471	32.4	.502538	.31944
44	-52.0508	-370.36	77.0467	.41825	32.2	.353749	.223147
45	-52.0508	-370.36	82.9733	.2279	32.1	.193163	.120939
END	-52.0508	-370.36	88.9	0	0	0	0

Sampling System Measurements

The following calculations confirm that the sample system as installed complies with Rule Section 73.151(c)(2)(1) in all respects. The sample torroids are Delta model TCT3 and their outputs are in agreement within the manufacturers specification of +/-2% and +/-2°. The antenna monitor is a Potomac Instruments model 1901. The antenna monitor calibration was checked against an Agilent model 4396A network analyzer in the amplitude and phase modes and the calibration of the monitor was found to be in agreement within the Potomac specifications. The sample lines are equal in length and constructed of ½" Andrew LDF4-50A coaxial cable that has a solid outer conductor and foam dielectric. The cables are equal in length within 1° as required. The cables have all been buried so as to be exposed to the same environmental conditions. The length of the cables was confirmed by measuring the impedance, looking into the line with the far end opened. The lines were found to be 7/4 wavelength long at the frequencies listed. These frequencies were used to calculate the electrical lengths of the lines at the operating frequency of 930 kHz. Frequencies were calculated at which the lines were +/- 45° the length of the resonate frequency. The impedance was then calculated using the following formula:

$$Zo = ((R1^2+X1^2)^{1/2} * (R2^2+X2^2)^{1/2})^{1/2}$$

Sample Line Length Calculation

Tower	Resonate Frequency At 630°, kHz	Electrical Length at 930 kHz, Degrees
1	1064.2	550.6
2	1064.3	550.5
3	1063.5	550.9

Sample Line Impedance Calculation

Tower	630° Resonant Frequency kHz	45° Above Resonant Frequency kHz	Resistance Ohms	Reactance Ohms	45° Below Resonant Frequency kHz	Resistance Ohms	Reactance Ohms	Characteristic Impedance Ohms
1	1064.18	1140.19	14.8	43.6	988.17	15.5	-48.87	48.59
2	1064.3	1140.32	15.59	42.48	988.28	17.36	-50.3	49.07
3	1063.48	1139.44	13.86	42.78	987.52	15.95	-49.72	48.46

The sample torroid calibration was confirmed by passing a common conductor through the torroids. The common conductor was driven by a Hewlett-Packard 4396A vector network analyzer that was properly calibrated for response measurement. The output from the tower #2 torroid was fed to the reference receiver of the analyzer and the other outputs were alternately fed to the B input. The output of the towers 1 and 3 torroids was compared to that of the tower 2 torroid and the results noted in the chart below.

Sample Torroid Calibration Verification

Tower	Serial Number	Indicated Ratio	Indicated Phase
1	17944	1.01	-0.3°
2	17945	1.00	0.00
3	17946	1.012	-0.53°

Sample Lines Terminated By Torroids

Tower	Serial Number	Impedance at Input to Sample Line with Torroid Connected
1	17944	51.0 +j4.3
2	17945	51.0 +j3.6
3	17946	50.0 +j4.7

Item 6

Direct Measurement of Power

The common point network in the nighttime phasor and the non-directional impedance were adjusted to yield the proper operating resistance of 50 ohms and a reactance of 0.0 (zero) ohms to the transmitter output. In order to compensate for hookup inductance between the power measurement point and the transmitter the common point reactance was set for a value of –j7 at the measurement point. Both operating powers were calculated at the common point. The common point currents were then calculated as indicated below.

Pattern	Nominal Power Watts	Operating Power Watts	Operating Common Point Current, Amps
Day	2100	2100	6.48
Night	500	540	3.16

Item 7

Reference Field Strength Measurements

Reference field strength measurements were made on radials having existing monitor point limits on the current license as well as on radials in the main lobes as follows:

Reference Field Strength Measurements

KOGA DA-Night

Radial (Deg.)	Point	Distance (Km)	Field (mV/m)	Coordinates (NAD 27)	Description
46	1	3.42	23	41° 9' 49.1"N 101° 41' 1.2"W	North side of highway 61 across from right of way marker next to pole.
	2	5.70	13.6	41° 10' 40.7"N 101° 39' 50.8"W	South west corner of intersection of highway 61 and Road East 130.
	3	12.34	4.72	41° 13' 10.4"N 101° 36' 25.1"W	South side of Keystone/Lake road at the gate in the fence line.
74	1	8.59	3.54	41° 9' 48.8"N 101° 36' 52.6"W	South side of Rd E 120 where power lines cross from north side to south side.
	2	10.24	3.91	41° 10' 4.9"N 101° 35' 44.3"W	West side of Keystone Roscoe road. Next to culvert and fiber optic sign 475 meters north of road east 120.
	3	15.00	2.42	41° 10' 46.4"N 101° 32' 27.2"W	Middle of road E J North. 1.8km north of road east 120.
98	1	6.45	14	41° 8' 4.5"N 101° 38' 13.0"W	Farm road 4.3km west of Roscoe. North on road to residence, measurement taken on road west of house.
	2	9.29	9.35	41° 7' 51.6"N 101° 36' 12.2"W	Farm road 1.5km West of Roscoe. North on road to fence line.
	3	11.57	4.79	41° 7' 39.5"N 101° 34' 35.2"W	South of highway 30 on Road E H North, 100 meters north of bridge in middle of roadway.

198	1	3.14	115	41° 6' 56.3"N 101° 43' 30.3"W	1000 meters west of highway 26 on Chuckwagon Rd, measurement taken on road at east end of pond.
	2	4.32	66.2	41° 6' 19.9"N 101° 43' 45.7"W	South east corner of Tressler Rd and road west 80.
	3	9.40	35.5	41° 3' 43.6"N 101° 44' 53.3"W	50 meters east of the intersection of road west 50 and road west A south.
254	1	3.36	34	41° 8' 3.5"N 101° 45' 7.0"W	790 meters north of road west 95 on SR 26-61. Measurement taken on east side of roadway.
	2	4.59	23.7	41° 7' 52.3"N 101° 45' 57.8"W	1km west of intersection SR 26-61 and road west 95. Take drive north 300m, measurement taken in middle of roadway.
	3	8.14	13	41° 7' 20.0"N 101° 48' 24.5"W	250 meters north of intersection of road west 90 and road west D north. Measurement taken in middle of roadway.
357	1	3.96	85.5	41° 10' 41.0"N 101° 42' 58.4"W	380 meters east of intersection of Ogallala Beach Rd and road east 130. Measurement taken in middle of roadway.
	2	4.62	76.1	41° 11' 2.5"N 101° 42' 59.6"W	660 meters north of road east 130. 335 meters east on farm drive. Measurement taken south of power pole transformers.
	3	5.72	70.4	41° 11' 38.1"N 101° 43' 1.4"W	East on O'Connor's drive 310 meters, next to "No Hunting" sign.

All measurements were taken March 19, 2013 with Potomac Instruments FIM-4100 field strength meter with serial number 133. The meter was calibrated by its manufacturer on March 29, 2011.

Item 7

RFR Compliance

Operation of KOGA at 2.1 kW daytime and 0.5 kW nighttime will not result in exposure of workers or the general public to rf radiation in excess of levels specified in 47CFR 1.1310. Fences have been installed around all tower bases to comply with the minimum distance which exceeds the distances specified in OET Bulletin 65 for this frequency, calculated power levels in the towers and tower height to prevent electric and magnetic exposure greater than permissible levels. These fences limit access by the general public. If it becomes necessary for workers to enter the tower base areas for maintenance, the station will either reduce power or cease operation to provide RFR safety for the workers.

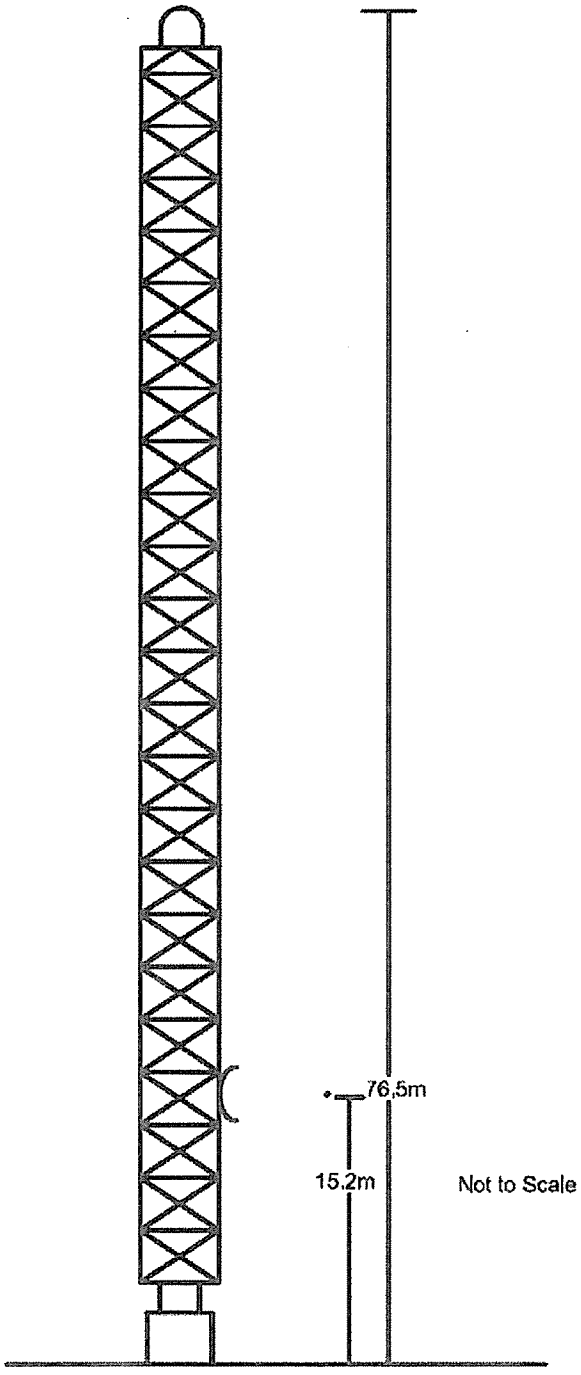
Item 8

Ground System Description

The ground system at KOGA remains as previously licensed and consists of 120 buried copper radials extending 80.8 meters plus 120 radials 15.2 meter interspersed between longer radials.

Appendix A

Depiction of STL antenna installation on Tower #1


76.5m
15.2m
Not to Scale

Appendix B

Tower Descriptions

The towers that make up the KOGA AM array are uniform cross-section, guyed towers and are described by the following chart of Antenna Structure Registration numbers and associated physical dimensions.

Tower number	Tower ASR number	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 (including obstruction lighting)
1	1026728	74.6	75.7	76.5
2	1026730	91.5	92.8	93.6
3	1026729	76.3	77.5	78.3