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RECEIVED

FEB - 8 A 5:32

John F. Garziglia  
Direct Dial: (202) 857-4455  
Direct Fax: (202) 261-0055  
E-mail: jgarziglia@wcsr.com

February 6, 2012

FILED/ACCEPTED

FEB - 6 2012

Federal Communications Commission  
Office of the Secretary

Ms. Marlene H. Dortch  
Secretary  
Federal Communications Commission  
455 12<sup>th</sup> Street, S.W.  
Washington, D.C. 20554

**Re: FCC 302-AM Application for Modified Broadcast License  
WAUB(AM), Auburn, NY (Fac. ID #43791)**

Dear Ms. Dortch:

Submitted herewith on behalf of Auburn Broadcasting, Inc., is an FCC Form 302-AM application for a modification of the WAUB(AM) license to utilize moment method modeling.

Should you have any questions in connection with this application or desire additional information, kindly contact the undersigned.

Sincerely,



John F. Garziglia

Enclosures



FOR  
FCC  
USE  
ONLY

**FCC 302-AM**  
**APPLICATION FOR AM**  
**BROADCAST STATION LICENSE**

(Please read instructions before filling out form.)

FOR COMMISSION USE ONLY

FILE NO.

*BMM-L-20120206ADW*

**SECTION I - APPLICANT FEE INFORMATION**

**FILED/ACCEPTED**

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

Auburn Broadcasting, Inc.

**FEB - 6 2012**

MAILING ADDRESS (Line 1) (Maximum 35 characters)  
3568 Lenox Road

Federal Communications Commission  
Office of the Secretary

MAILING ADDRESS (Line 2) (Maximum 35 characters)

CITY  
Geneva

STATE OR COUNTRY (if foreign address)  
NY

ZIP CODE  
14456

TELEPHONE NUMBER (include area code)  
(315) 781-7000

CALL LETTERS  
WAUB

OTHER FCC IDENTIFIER (If applicable)  
43791

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			
0	0	0	1

(C)
FEE DUE FOR FEE TYPE CODE IN COLUMN (A)
\$ Modification of License Application

FOR FCC USE ONLY

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)			
0	0	0	1

(C)
\$

FOR FCC USE ONLY

ADD ALL AMOUNTS SHOWN IN COLUMN C, AND ENTER THE TOTAL HERE. THIS AMOUNT SHOULD EQUAL YOUR ENCLOSED REMITTANCE.

TOTAL AMOUNT REMITTED WITH THIS APPLICATION
\$ Modification of License Application

FOR FCC USE ONLY



SECTION II - APPLICANT INFORMATION		
1. NAME OF APPLICANT Auburn Broadcasting, Inc.		
MAILING ADDRESS 3568 Lenox Road		
CITY Geneva	STATE NY	ZIP CODE 14456

2. This application is for:

- ☒ Commercial
 ☐ Noncommercial  
☒ AM Directional
 ☐ AM Non-Directional

Call letters WAUB	Community of License Auburn, NY	Construction Permit File No. n/a	Modification of Construction Permit File No(s). n/a	Expiration Date of Last Construction Permit n/a
----------------------	------------------------------------	-------------------------------------	-----------------------------------------------------------	-------------------------------------------------------

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

☐ Yes ☐ No

If No, explain in an Exhibit.

Exhibit No.  
n/a

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

☐ Yes ☐ No

If No, state exceptions in an Exhibit.

Exhibit No.  
n/a

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

☐ Yes ☐ No

If Yes, explain in an Exhibit.

Exhibit No.  
n/a

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

☐ Yes ☐ No

If No, explain in an Exhibit.

☒ Does not apply

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).

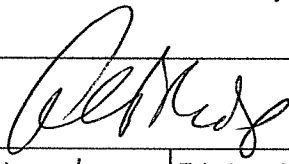
The APPLICANT acknowledges that all the statements made in this application and attached exhibits are considered material representations and that all the exhibits are a material part hereof and are incorporated herein as set out in full in

#### 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 ALAN BISHOP	Signature 	
Title VICE PRESIDENT	Date 1/31/12	Telephone Number 3157817000

**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

AUBURN BROADCASTING INC.

PURPOSE OF AUTHORIZATION APPLIED FOR: (check one)



Station License



Direct Measurement of Power

1. Facilities authorized in construction permit					
Call Sign <b>WAUB</b>	File No. of Construction Permit (if applicable) N/A	Frequency (kHz) 1590	Hours of Operation  UNLIMITED	Power in kilowatts	
				Night 1.0	Day .50
2. Station location					
State <b>NEW YORK</b>			City or Town <b>AURELIUS</b>		
3. Transmitter location					
State <b>NY</b>	County <b>CAYUGA</b>		City or Town <b>AURELIUS</b>	Street address (or other identification) 5998 EXPERIMENTAL ROAD	
4. Main studio location					
State <b>NY</b>	County <b>CAYUGA</b>		City or Town <b>AURELIUS</b>	Street address (or other identification) 5998 EXPERIMENTAL ROAD	
5. Remote control point location (specify only if authorized directional antenna)					
State <b>NY</b>	County <b>CAYUGA</b>		City or Town <b>AURELIUS</b>	Street address (or other identification) 5998 EXPERIMENTAL ROAD	

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.  
ENG. EXHIBIT

8. Operating constants:						
RF common point or antenna current (in amperes) without modulation for night system 4.65			RF common point or antenna current (in amperes) without modulation for day system 3.29			
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 +/-j0 Day +/-j0			
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(S)	+139.6	+120.5	.502	.500	2.20	1.35
2(C)	0	0	1.000	1.000	4.30	2.70
3(N)	-144.7	-121.6	.436	.410	1.80	1.10
Manufacturer and type of antenna monitor: DELTA DAM-1 (SERIAL 101)						



### 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.
SEE ENGINEERING EXHIBIT	SEE ENGINEERING EXHIBIT	SEE ENGINEERING EXHIBIT	SEE ENGINEERING EXHIBIT	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 42 ° 54 ' 34 "	West Longitude 76 ° 36 ' 9 "
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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.  
ENG. EXHIBIT

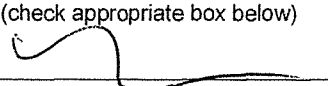
Also, if necessary for a complete description, attach as an Exhibit a sketch of the details and dimensions of ground system.

Exhibit No.  
ENG. EXHIBIT

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) RICHARD C. POGSON	Signature (check appropriate box below) 
Address (include ZIP Code) 7961 WEST LAKE ROAD FAIRVIEW, PA 16415	Date 12/15/11
	Telephone No. (Include Area Code) 8144745129

☐ Technical Director

☐ Registered Professional Engineer

☐ Chief Operator

☒ Technical Consultant

☐ Other (specify)



ENGINEERING EXHIBIT

APPLICATION FOR RELICENSING  
WAUB-AM 1590 KHZ

Prepared For:  
Auburn Broadcasting Inc.  
Auburn, NY

December 2011

Prepared By:  
Diversified Communications Systems



## CONTENTS

FCC Form 302-AM Section III  
Engineering Exhibit  
Measured vs. Modeled Parameters  
Modifications to Modeled Parameters  
Sampling System Measurements  
Daytime Reference Field Tabulation  
Nighttime Reference Field Tabulation  
Daytime Model Summary  
Nighttime Model Summary



EXHIBIT #1  
Diversified Communications Systems  
7961 West Lake Road, Fairview, PA 16415  
814-474-5129

ENGINEERING STATEMENT OF RICHARD C. POGSON, CPBE  
Prepared for: Auburn Broadcasting Inc.  
Regarding: WAUB (AM) Application for Relicensing

The Applicant, Auburn Broadcasting Inc., licensee of WAUB-AM Auburn, New York, is requesting authority to relicense the existing facilities of WAUB-AM utilizing moment method modeling. This request follows a recently conducted moment method proof of performance in which the results are tabulated in this exhibit. The licensee is currently operating under Special Temporary Authority having adjusted the WAUB-AM array parameters to the modeled values.

METHOD OF MEASUREMENT

The WAUB-AM base impedances were measured at the location of the existing current transformers. During the measurement process the other towers in the array were open circuited at the location of the current transformers. Measurements were performed utilizing a Array Solutions PowerAIM 120 analyzer. The series inductance of the feed system from the above-described location to the tower was then measured with the base insulator of the tower short circuited.

The WAUB-AM sample lines were measured as required by FCC Rule 47 CFR Section 73.151(c)(2)(I). The sample lines were open-circuited and the series resonant frequency closest to the carrier frequency of 1590 Khz was determined for each sample line. Utilizing this data the electrical length of each of the sample lines was then calculated. The characteristic impedance of the sample lines was determined by measurements at frequencies at which the calculated line length would be one-eighth wavelength below and above the measured open circuit resonant frequency. The associated current transformers were tested utilizing a common current reference and found to be within the manufacturer's specifications. In addition, measurements were performed with the sample device connected for the purpose of future reference.



## REFERENCE MEASUREMENTS

Reference field strength measurements were performed in the directions of the WAUB-AM pattern minima and maxima as detailed in FCC Rule 73.151(c)(3). Three measurements were performed on each radial at distances ranging from approximately .5 kilometers to 7.5 kilometers. The results of the above-referenced measurements are tabulated in this exhibit.

## DESCRIPTION OF ANTENNA SYSTEM

The existing WAUB-AM antenna system as originally constructed consists of three triangular, uniform cross section, guyed vertical radiators of uniform height above ground level. Each of the towers in the array has an overall height above ground of 48.0 meters. No obstruction lighting is employed. Height above the insulators for each tower is 47.0 meters. The towers are spaced at 47.0 meters between adjacent towers on a line bearing 350° True.

## DESCRIPTION OF GROUND SYSTEM

The WAUB-AM ground system consists of 120 equally spaced buried copper wire radials 47.26 meters in length about the base of each tower except where intersecting radials are shortened and bonded to a transverse copper strap midway between adjacent towers. In addition there are 120 copper radials each 15.24 meters in length interspersed between the 47.26-meter radials about the base of each tower.

## DESCRIPTION OF SAMPLING SYSTEM

The WAUB-AM sampling system consists of Delta TCT-3 toroid transformers located at the output of the associated tuning units. The associated sample lines consist of 184.5 meters of Andrew LD4-50 phase stabilized sampling line and are subject to equal environmental conditions. The above-described sampling lines are connected to a Delta DAM-1(Serial 101) antenna monitor.

As will be demonstrated by the tabulated data contained in this exhibit the WAUB (AM) directional antenna system is now operating within modeled parameters.

Respectfully Submitted By,  
Richard C. Pogson CPBE



WAUB-AM  
AUBURN, NEW YORK

Tower#	Existing Height	Modeled Height	Deviation	Percentage
1	47.2 M	52.5 M	+5.3 M	111.2%
2	47.2 M	50.0 M	+2.8 M	105.9%
3	47.2 M	51.0 M	+3.8 M	108.0%

Tower#	Existing Radius	Modeled Radius	Deviation	Percentage
1	.2183 M	.2188 M	+.0005M	100.2%
2	.2183 M	.2188 M	+.0005M	100.2%
3	.2183 M	.2188 M	+.0005M	100.2%

Tower#	Measured Resistance	Modeled Resistance	Deviation	Percentage
1	61.0 $\Omega$	62.55 $\Omega$	+ 1.55 $\Omega$	+2.54%
2	48.5 $\Omega$	47.51 $\Omega$	- 0.99 $\Omega$	-2.04%
3	55.0 $\Omega$	55.89 $\Omega$	+ 0.89 $\Omega$	+ 1.62%

Tower#	Measured Reactance	Xs	Modeled Reactance	Deviation	Percentage
1	+93.8 $\Omega$	+18.0 $\Omega$	94.33 $\Omega$	+ 0.53 $\Omega$	+0.56%
2	+87.4 $\Omega$	+38.0 $\Omega$	87.22 $\Omega$	- 0.18 $\Omega$	-0.21%
3	+90.6 $\Omega$	+29.0 $\Omega$	89.40 $\Omega$	- 1.20 $\Omega$	- 1.34%



WAUB-AM

AUBURN, NY

MODIFICATIONS TO MODELED PARAMETERS

Tower#	Measured Series Inductance	Measured Parallel Capacitance	Loss	Phase Shift
1	1.80uH	6.7pF	.1%	-.2°
2	3.80uH	7.3pF	.1%	-.2°
3	2.90uH	8.0pF	.1%	-.3°

MODELED PARAMETERS

Tower#	Day Sample Current Ratio	Night Sample Current Ratio	Day Phase	Night Phase
1	.500	.502	+120.5°	+139.6°
2	1.000	1.000	0°	0°
3	.410	.436	-121.7°	-144.8°

MODIFIED PARAMETERS

Tower#	Day Sample Current Ratio	Night Sample Current Ratio	Day Phase	Night Phase
1	.500	.502	+120.5°	+139.6°
2	1.000	1.000	0°	0°
3	.410	.436	-121.6°	-144.7°



WAUB-AM

AUBURN, NEW YORK

SAMPLING SYSTEM MEASUREMENTS

Sampling Line#	Resonant Frequency	Calculated Electrical Length
1	1.7450 Mhz	410.03°
2	1.7464 Mhz	409.68°
3	1.7463 Mhz	409.72°

Sampling Line#	Nominal Impedance	Calculated Impedance
1	50.0 $\Omega$	52.0 $\Omega$
2	50.0 $\Omega$	51.7 $\Omega$
3	50.0 $\Omega$	51.9 $\Omega$



POINT #	DISTANCE	DATE	mV/m	RADIAL	DESCRIPTION	LATITUDE	LONGITUDE
1	.62 km	8/26/2010	540	350	On Ex. .1 Mi. South of H/A	42-54-54	76-36-12.7
2	2.03 km	8/26/2010	132	350	M&R Sports and Mower	42-55-39	76-36-23.6
3	2.95 km	8/26/2010	80	350	Canoga Rd. Pole #33	42-56-08	76-36-31.4
1	2.2 km	8/26/2010	5.1	230	Sevior Rd. Pole #522	42-53-48	76-37-22
2	3.48 km	8/26/2010	1.95	230	Ridge Rd. .05 Mi. E of H/A	42-53-21.4	76-38-05.2
3	4.31 km	8/26/2010	2.55	230	Lockwood Rd. Red Fire Hydrant	42-53-04	76-38-33.3
1	2.93 km	8/26/2010	1.55	210	Int of Large Rd. and Sevior Rd.	42-53-12	76-37-12.5
2	4.48 km	8/26/2010	2.75	210	Int. of Ridge Rd. & Fitzpatrick Rd.	42-52-28.7	76-37-47
3	6.54 km	8/26/2010	0.93	210	Powers Road Pole #98	42-51-31.3	76-38-33.3
1	2.46 km	8/26/2010	13.2	170	Riester Rd. .1 Mi. E of Bluefield	42-53-15.7	76-35-48.4
2	4.0 km	8/26/2010	8.5	170	Kijowski Rd. Pole #1	42-52-26.8	76-35-35.9
3	5.49 km	8/26/2010	4.2	170	2265 Dublin Road	42-51-39.2	76-35-25.8
1	2.98 km	8/26/2010	3.45	130	P/L Mid State Mutual Ins. Co.	42-53-31.9	76-34-27.2
2	3.93 km	8/26/2010	3.5	130	Silver St. Road Pole #15	42-53-12.2	76-33-55.1
3	7.18 Km	8/26/2010	0.72	130	Stone School Rd. 350' From T Int.	42-52-04.8	76-32-04.6
1	1.66 Km	8/26/2010	8.5	110	Dunning Ave Pole #15	42-54-15	76-34-59
2	3.73 Km	8/26/2010	3.75	110	Sand Beach Road Pole #9	42-53-52.6	76-33-33.1
3	4.44 km	8/26/2010	1.65	110	The Bird House P/L	42-53-44.8	76-33-03.4

WAUB DAYTIME FIELD TABULATIONS (NAD 83 DATUM)



POINT #	DISTANCE	DATE	mV/m	RADIAL	DESCRIPTION	LATITUDE	LONGITUDE
1	.62 Km	10/28/2010	640	350	On Ex. .1 Mi. South of H/A	42-54-54	76-36-12.7
2	2.03 Km	10/28/2010	161	350	M&r Sports and Mower	42-55-39	76-36-23.6
3	2.95 Km	10/28/2010	105	350	Canoga Rd. Pole #33	42-56-08	76-36-31.4
1	1.89 Km	10/28/2010	1.8	245	NYSEG Pole 20-1 H/A Rd.	42-54-08	76-37-23.2
2	4.10 Km	10/28/2010	1.45	245	Mon. Point Location	42-53-37.1	76-38-51.7
3	5.73 Km	10/28/2010	1.3	245	Webb Rd. 60' N of Utility Pole	42-53-15.2	76-39-57.1
1	2.36 Km	10/28/2010	4.2	225	Mon. Point Location	42-53-39.9	76-37-21.3
2	4.52 Km	10/28/2010	1.35	225	Lockwood Rd. Left Curve Sign	42-52-50.5	76-38-28.9
3	5.77 Km	10/28/2010	0.75	225	Fitzpatrick Rd. Right Curve Sign	42-52-21.9	76-39-07.6
1	2.46 Km	10/28/2010	39.5	170	Riester Rd. .1 Mi. E of Bluefield	42-53-15.7	76-35-48.4
2	4.00 Km	10/28/2010	22.5	170	Kijowski Rd. Pole #1	42-52-26.8	76-35-35.9
3	5.49 Km	10/28/2010	12.7	170	2265 Dublin Road	42-51-39.2	76-35-25.8
1	.77 Km	10/28/2010	22.2	115	50' From Int. Bluefield & Koon	42-54-23.5	76-35-37.0
2	1.74 Km	10/28/2010	5.9	115	Dunning Ave. Utility Pole 16A1	42-54-10.0	76-34-58.4
3	3.25 Km	10/28/2010	6	115	South St. Rd. & Silver Rd.	42-53-48.9	76-33-58.4
1	1.54 Km	10/28/2010	6.9	95	25' S of UP 138 on Dunning Ave	42-54-29.5	76-35-00
2	3.09 Km	10/28/2010	3.2	95	5992 South State Road	42-54-24.7	76-33-51.6
3	4.53 Km	10/28/2010	2.2	95	Gate #3 St. Joseph Cem.	42-54-21.5	76-32-48.3

WAUB NIGHTTIME FIELD TABULATIONS (NAD 83 DATUM)



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10:39:20

#### WAUB ARRAY

#### GEOMETRY

Dimensions in meters

Environment: perfect ground

wire	caps	Distance	Angle	Z	radius	segs
1	none	0	0	0	.2188	20
		0	0	52.5		
2	none	47.	350.	0	.2188	20
		47.	350.	50.		
3	none	94.	350.	0	.2188	20
		94.	350.	51.		

Number of wires = 3  
current nodes = 60

	minimum		maximum	
Individual wires	wire	value	wire	value
segment length	2	2.5	1	2.625
segment/radius ratio	2	11.426	1	11.9973
radius	1	.2188	1	.2188

#### ELECTRICAL DESCRIPTION

Frequencies (KHz)

frequency			no. of steps	segment length (wavelengths)	
no.	lowest	step		minimum	maximum
1	1,590.	0	1	.0132588	.0139218

#### Sources

source	node	sector	magnitude	phase	type
1	1	1	122.804	77.3	voltage
2	21	1	339.303	300.2	voltage
3	41	1	349.273	190.5	voltage

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10:39:20

#### IMPEDANCE

normalization = 50.

freq (KHz)	resist (ohms)	react (ohms)	imped (ohms)	phase (deg)	VSWR	S11 dB	S12 dB
source = 1; node 1, sector 1							
1,590.	13.413	52.051	53.752	75.6	7.9096	-2.2081	-3.995
source = 2; node 21, sector 1							
1,590.	38.301	63.743	74.365	59.	3.9393	-4.5085	-1.8985
source = 3; node 41, sector 1							
1,590.	60.621	176.41	186.53	71.	12.222	-1.4245	-5.5339

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#### CURRENT rms

Frequency = 1590 KHz  
Input power = 540. watts  
Efficiency = 100. %  
coordinates in meters



current imaginary				mag	phase	real	
no. X	Y	Z	(amps)	(deg)	(amps)	(amps)	
GND 0	0	0	1.61556	1.7	1.61481		
.0493316							
2 0	0	2.625	1.66458	1.3	1.66417		
.0369076							
3 0	0	5.25	1.68218	1.	1.68193		
.0290147							
4 0	0	7.875	1.68409	.8	1.68395		
.0221135							
5 0	0	10.5	1.67199	.5	1.67191		
.0158722							
6 0	0	13.125	1.64675	.4	1.64671		
.0101618							
7 0	0	15.75	1.60895	.2	1.60895	4.94E-	
03							
8 0	0	18.375	1.55911	0.0	1.55911	2.09E-	
04							
9 0	0	21.	1.49768	359.8	1.49768	-	
4.02E-03							
10 0	0	23.625	1.42519	359.7	1.42517	-	
7.71E-03							
11 0	0	26.25	1.34215	359.5	1.3421		
-.0108343							
12 0	0	28.875	1.24911	359.4	1.24904		
-.0133486							
13 0	0	31.5	1.14668	359.2	1.14658		
-.0152126							
14 0	0	34.125	1.03543	359.1	1.0353		
-.0163846							
15 0	0	36.75	.915931	358.9	.915776		
-.0168226							
16 0	0	39.375	.788693	358.8	.78852		
-.0164851							
17 0	0	42.	.654082	358.7	.653903		
-.0153283							
18 0	0	44.625	.512131	358.5	.511958		
-.0133012							
19 0	0	47.25	.362098	358.4	.36195		
-.0103286							
20 0	0	49.875	.20139	358.2	.201293	-	
6.27E-03							
END 0	0	52.5	0	0	0	0	
GND 46.286	8.16147	0	3.22643	241.2	-1.55431	-	
2.82736							
22 46.286	8.16147	2.5	3.34603	239.9	-1.67893	-	
2.89432							
23 46.286	8.16147	5.	3.39453	239.1	-1.74122	-	
2.91392							
24 46.286	8.16147	7.5	3.40999	238.5	-1.77974	-	
2.9087							
25 46.286	8.16147	10.	3.39621	238.	-1.7983	-	
2.88103							
26 46.286	8.16147	12.5	3.35513	237.6	-1.79875	-	
2.83221							
27 46.286	8.16147	15.	3.28792	237.2	-1.78207	-	
2.76308							
28 46.286	8.16147	17.5	3.19552	236.8	-1.74897	-	
2.67441							
29 46.286	8.16147	20.	3.07881	236.5	-1.70002	-	
2.56691							
30 46.286	8.16147	22.5	2.93868	236.2	-1.63575	-	
2.44134							



31	46.286	8.16147	25.	2.77606	235.9	-1.55674	-
2.29849	46.286	8.16147	27.5	2.5919	235.6	-1.4635	-
2.13919	46.286	8.16147	30.	2.38724	235.4	-1.35663	-
1.9643	46.286	8.16147	32.5	2.16306	235.1	-1.23668	-
1.77467	46.286	8.16147	35.	1.92032	234.9	-1.10418	-
1.57112	46.286	8.16147	37.5	1.65983	234.7	-0.959583	-
1.35434	46.286	8.16147	40.	1.38207	234.5	-0.803158	-
1.12475	46.286	8.16147	42.5	1.08684	234.3	-0.634741	
0.882223	46.286	8.16147	45.	0.772173	234.1	-0.453152	
0.625223	46.286	8.16147	47.5	0.432195	233.9	-0.25485	
-0.349061	46.286	8.16147	50.	0	0	0	0
END	46.286	8.16147	0	1.32409	119.5	-0.65131	
1.15282	92.5719	16.3229	2.55	1.46805	117.5	-0.677747	
1.30224	92.5719	16.3229	5.1	1.54424	116.5	-0.688793	
1.38212	92.5719	16.3229	7.65	1.59585	115.7	-0.692836	
1.43761	92.5719	16.3229	10.2	1.62709	115.1	-0.690743	
1.47319	92.5719	16.3229	12.75	1.63993	114.6	-0.682949	
1.49095	92.5719	16.3229	15.3	1.6354	114.2	-0.669718	
1.49199	92.5719	16.3229	17.85	1.61422	113.8	-0.651259	
1.47701	92.5719	16.3229	20.4	1.57693	113.5	-0.62776	1.4466
49	92.5719	16.3229	22.95	1.52408	113.2	-0.599412	
1.40126	92.5719	16.3229	25.5	1.45619	112.9	-0.56641	
1.34151	92.5719	16.3229	28.05	1.3738	112.6	-0.52896	
1.26788	92.5719	16.3229	30.6	1.27746	112.4	-0.48727	
1.18088	92.5719	16.3229	33.15	1.16777	112.2	-0.441551	
54	92.5719	16.3229	35.7	1.04525	112.	-0.392005	
0.968953	92.5719	16.3229	38.25	0.910371	111.8	-0.338803	
0.844978	92.5719	16.3229	40.8	0.763434	111.7	-0.282054	0.70942
57	92.5719	16.3229	43.35	0.60434	111.5	-0.221725	
0.562196	92.5719	16.3229	45.9	0.432019	111.4	-0.15744	
0.402309	92.5719	16.3229	48.45	0.243128	111.2	-0.0880151	
0.226637	92.5719	16.3229	51.	0	0	0	0
END	92.5719	16.3229					



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#### WAUB NIGHTTIME

#### GEOMETRY

Dimensions in meters

Environment: perfect ground

wire	caps	Distance	Angle	Z	radius	segs
1	none	0	0	0	.2188	20
		0	0	52.5		
2	none	47.	350.	0	.2188	20
		47.	350.	50.		
3	none	94.	350.	0	.2188	20
		94.	350.	51.		

Number of wires = 3  
current nodes = 60

	minimum		maximum	
Individual wires	wire	value	wire	value
segment length	2	2.5	1	2.625
segment/radius ratio	2	11.426	1	11.9973
radius	1	.2188	1	.2188

#### ELECTRICAL DESCRIPTION

Frequencies (KHz)

frequency			no. of steps	segment length (wavelengths)	
no.	lowest	step		minimum	maximum
1	1,590.	0	1	.0132588	.0139218

#### Sources

source	node	sector	magnitude	phase	type
1	1	1	246.859	87.9	voltage
2	21	1	613.908	287.1	voltage
3	41	1	538.166	161.9	voltage

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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 1, sector 1							
1,590.	2.7711	61.404	61.467	87.4	45.289	-.38364	-10.729
source = 2; node 21, sector 1							
1,590.	30.928	70.163	76.678	66.2	5.2273	-3.3647	-2.6826
source = 3; node 41, sector 1							
1,590.	10.872	153.64	154.02	86.	48.22	-.36031	-10.99

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#### CURRENT rms

Frequency = 1590 KHz

Input power = 1,080. watts

Efficiency = 100. %

coordinates in meters

current

imaginary

mag

phase real



no.	X	Y	Z	(amps)	(deg)	(amps)	(amps)
GND	0	0	0	2.83983	.4	2.83974	
.0216883							
2	0	0	2.625	2.94285	.3	2.9428	
.0173583							
3	0	0	5.25	2.98363	.3	2.9836	
.014431							
4	0	0	7.875	2.99478	.2	2.99476	
.0117012							
5	0	0	10.5	2.97975	.2	2.97974	9.07E-
03							
6	0	0	13.125	2.94032	.1	2.94031	6.5E-
03							
7	0	0	15.75	2.87762	.1	2.87762	4.E-03
8	0	0	18.375	2.79259	0.0	2.79259	1.6E-
03							
9	0	0	21.	2.68615	360.	2.68615	-
6.74E-04							
10	0	0	23.625	2.55919	359.9	2.55918	-
2.78E-03							
11	0	0	26.25	2.41269	359.9	2.41269	-
4.67E-03							
12	0	0	28.875	2.24769	359.8	2.24768	-
6.31E-03							
13	0	0	31.5	2.06525	359.8	2.06524	-
7.63E-03							
14	0	0	34.125	1.86644	359.7	1.86642	-
8.58E-03							
15	0	0	36.75	1.65232	359.7	1.6523	-
9.13E-03							
16	0	0	39.375	1.42382	359.6	1.42379	-
9.21E-03							
17	0	0	42.	1.1816	359.6	1.18157	-
8.78E-03							
18	0	0	44.625	.92575	359.5	.925717	-
7.78E-03							
19	0	0	47.25	.654938	359.5	.654909	-
6.16E-03							
20	0	0	49.875	.364474	359.4	.364455	-3.8E-
03							
END	0	0	52.5	0	0	0	0
GND	46.286	8.16147	0	5.66136	220.8	-4.28271	-
3.70261							
22	46.286	8.16147	2.5	5.89327	219.8	-4.52869	-
3.77116							
23	46.286	8.16147	5.	5.99076	219.2	-4.64316	-
3.78554							
24	46.286	8.16147	7.5	6.02752	218.7	-4.70333	-
3.76958							
25	46.286	8.16147	10.	6.01093	218.3	-4.71693	-
3.72583							
26	46.286	8.16147	12.5	5.94473	217.9	-4.68777	-
3.65576							
27	46.286	8.16147	15.	5.83117	217.6	-4.61803	-
3.56039							
28	46.286	8.16147	17.5	5.67202	217.3	-4.50932	-
3.44062							
29	46.286	8.16147	20.	5.46889	217.1	-4.36302	-
3.2974							
30	46.286	8.16147	22.5	5.22342	216.8	-4.18052	-
3.13167							
31	46.286	8.16147	25.	4.93727	216.6	-3.96317	-
2.94447							
32	46.286	8.16147	27.5	4.61223	216.4	-3.71242	-
2.73689							
33	46.286	8.16147	30.	4.25008	216.2	-3.42972	-



2.51003							
34	46.286	8.16147	32.5	3.85267	216.	-3.11654	-2.265
35	46.286	8.16147	35.	3.42171	215.8	-2.77427	-
2.00287							
36	46.286	8.16147	37.5	2.95865	215.7	-2.40407	-
1.72454							
37	46.286	8.16147	40.	2.4644	215.5	-2.00666	-
1.4306							
38	46.286	8.16147	42.5	1.93857	215.3	-1.58168	-
1.12087							
39	46.286	8.16147	45.	1.37773	215.2	-1.1263	
-.793481							
40	46.286	8.16147	47.5	.771356	215.	-.631808	
-.442504							
END	46.286	8.16147	50.	0	0	0	0
GND	92.5719	16.3229	0	2.47068	76.	.598012	
2.39721							
42	92.5719	16.3229	2.55	2.70234	75.6	.670439	
2.61785							
43	92.5719	16.3229	5.1	2.82144	75.4	.708819	
2.73095							
44	92.5719	16.3229	7.65	2.89857	75.3	.735081	
2.80381							
45	92.5719	16.3229	10.2	2.94079	75.2	.751408	
2.84317							
46	92.5719	16.3229	12.75	2.95143	75.1	.758825	
2.85222							
47	92.5719	16.3229	15.3	2.93231	75.	.757878	
2.83268							
48	92.5719	16.3229	17.85	2.88467	75.	.748926	
2.78576							
49	92.5719	16.3229	20.4	2.80954	74.9	.732266	
2.71244							
50	92.5719	16.3229	22.95	2.70789	74.8	.708182	
2.61365							
51	92.5719	16.3229	25.5	2.58069	74.8	.676934	
2.49033							
52	92.5719	16.3229	28.05	2.42893	74.8	.63881	
2.34343							
53	92.5719	16.3229	30.6	2.25364	74.7	.594098	
2.17392							
54	92.5719	16.3229	33.15	2.05585	74.7	.543089	
1.98282							
55	92.5719	16.3229	35.7	1.83655	74.7	.486066	
1.77106							
56	92.5719	16.3229	38.25	1.59659	74.6	.423275	
1.53947							
57	92.5719	16.3229	40.8	1.33653	74.6	.354877	
1.28856							
58	92.5719	16.3229	43.35	1.05621	74.6	.280849	
1.01819							
59	92.5719	16.3229	45.9	.753801	74.6	.200711	
.726588							
60	92.5719	16.3229	48.45	.423533	74.5	.112922	
.408202							
END	92.5719	16.3229	51.	0	0	0	0