Federal Communications Commission
Washington, D. C. 20554

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

FOR FCC USE ONLY

FCC 302-AM
APPLICATION FOR AM BROADCAST STATION LICENSE

(Please read instructions before filling out form.)

FOR COMMISSION USE ONLY

FILE NO.

SECTION I - APPLICANT FEE INFORMATION

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

WLXX-AM License Corp.

MAILING ADDRESS (Line 1) (Maximum 35 characters)

5999 Center Drive, Suite 4083

MAILING ADDRESS (Line 2) (Maximum 35 characters)

CITY	STATE OR COUNTRY (if foreign address)	ZIP CODE
Los Angeles	CA	90045

TELEPHONE NUMBER (include area code)	CALL LETTERS	OTHER FCC IDENTIFIER (If applicable)
3103483600	WRTO	CHICAGO

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: Amendment to pending application BMML20100517AFU

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

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

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

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

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

TOTAL AMOUNT REMITTED WITH THIS APPLICATION	FOR FCC USE ONLY
$	

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SECTION II - APPLICANT INFORMATION		
1. NAME OF APPLICANT WLXX-AM LICENSE CORP.		
MAILING ADDRESS 5999 CENTER DRIVE SUITE 4083		
CITY LOS ANGELES	STATE CA	ZIP CODE 90045

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
WRTO	CHICAGO	BP-20090427AAB		05/04/2012

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

☐ Yes ☑ No

N/A directional

If No, explain in an Exhibit.

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

☑ Yes ☐ No

Exhibit No.

If No, state exceptions in an Exhibit.

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

Exhibit No.

If Yes, explain in an Exhibit.

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.

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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	
Christopher G. Wood		
Title	Date	Telephone Number
Vice President and Assistant General Counsel	4/21/2011	3103483600

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

WLXX-AM LICENSE CORP.

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
WRTO	BP-20090427AAB	1200	UNLIMITED	4.5	20

2. Station location

State	City or Town
IL	CHICAGO

3. Transmitter location

State	County	City or Town	Street address (or other identification)
IL	COOK	CHICAGO	247 W. 127TH sTREET

4. Main studio location

State	County	City or Town	Street address (or other identification)
IL	COOK	CHICAGO	625 N. MICHIGAN AVE SUITE 300

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

State	County	City or Town	Street address (or other identification)
IL	COOK	CHICAGO	625 N. MICHIGAN AVE SUITE 300

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. SEE 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
9.68	20.5

Measured antenna or common point resistance (in ohms) at operating frequency		Measured antenna or common point reactance (in ohms) at operating frequency	
Night	Day	Night	Day
50	50	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	-57.6	-55.7	.244	.653		
2	0	+49.1	1.0	.369		
3	+22.9	0	.319	1.0		
4	+24.2	+71.6	.769	.657		
5	+118.3		1.004			
6	+144.6		.658			

Manufacturer and type of antenna monitor: Potomac Instruments AM 1901 SN 796

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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.
SELF ☐ SUPPORTING SEE TECH EXHIBIT	56.3	57.6	57.6	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	West Longitude
41 ° 39 ' 43 "	87 ° 37 ' 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 TECH EX

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

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

SEE TECH EXHIBIT

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

N/A NEWLY CONSTRUCTED SITE

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)
CHARLES W. STAPLES	
Address (include ZIP Code) 4424 GLENWICK LANE UNIVERSITY PARK, TX 75205	Date 04/20/2011
	Telephone No. (Include Area Code) 214 526 6200

☐ Technical Director ☐ Registered Professional Engineer

☐ Chief Operator ☑ Technical Consultant

☐ Other (specify)

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WLXX-AM License Corp
WRTO (AM) 1200 kHz
20 kW DA-D 4.5 kW DA-N
Facility ID 11196
Chicago, Illinois
Amendment to BMML-20100517AFU

The following additional information is provided in the form of an amendment in response to the letter of August 31, 2010.

1. With respect to deficiencies, 1, and 2 with respect to 73.151 (c) of the rules, the model was updated to be in compliance with the 3.66 meter face tower. The new model used does not violate the guidelines of the software. The following pages contain details of the model, model of towers one through 6 self impedance, base calculations of the modeled values to the point where the towers were measured, and verification of the model. All day and night system modeling was updated to reflect the change in the modeled towers.
2. With respect to deficiency 3, the two unused towers in the day mode were detuned with reactance substituted in the calculations. This detail was omitted in the previous filing. The model was updated to show towers five and six to be de-tuned with reactance of 279 and 309 ohms respectively.
3. With respect to deficiency 4, the base calculations were updated for tower two as a negative power flow tower. Also, tower 5 night is a negative power flow tower. The base calculations were updated for it as well. See the day and night base calculations in the following pages.
4. With respect to deficiency 5, the sampling transformers were measured with the transformers removed and disconnected using a HP 8752A Network Analyzer as the common signal source. The measured values were as follows:

Tower	Magnitude	Phase (Deg.)
1	0.9986	0.3
2	0.9991	0.1
3 Reference	1.000	0
4	0.9968	0.1
5	1.0051	-0.2
6	0.9974	0.2

5. With respect to deficiency 6, the antenna monitor was a new Potomac Instruments AM1901-6. It has a valid calibration certificate. It was calibrated according to the manufacturer's specifications. Additionally, it was driven with a common signal from a Potomac SG31 generator, fed to each input, and compared to the reference. It was found to be well within the manufacturer's specifications.

WLXX-AM License Corp
WRTO (AM) 1200 kHz
2 0 kW DA-D 4.5 kW DA-N
Facility ID 11196
Chicago, Illinois
Amendment
Details of Model

Height (feet)	Height Elect. Deg.	Face Width (Max Ft)	Min R m 80%	R m	Max R m 150%	Model R m
0-20	0 to 8.78	12	1.397	1.746	2.619	1.5039
20-40	8.78 to 17.6	10	1.1642	1.455	2.183	1.5039
40-60	17.6 to 26.353	8	0.931	1.164	1.746	1.0188
60-80	26.353 to 35.137	6	0.6986	0.8732	1.3098	1.0188
80-100	35.137 to 43.9	4	0.4656	0.5821	0.873	0.6986
100-120	43.9 to 52.7	3	0.3492	0.4365	0.655	0.4656
120-185	52.7 to 81.255	2	0.232	0.291	0.4365	0.395

	Z ATU Measured Self Impedance	Z ATU Model Self Impedance	Twr Model Self Impedance	LFeed uH	H (deg)	C sdrain pF	Base Ins* pF
T1	35.5 +j19.2	34.3 +j19.7	34.223-j6.3	3.5	92.2	8	30
T2	31.5+j7.2	31.577 +j7.759	31.667 -j14.623	3	91	8	30
T3	34.5+j12	35.3+j11.38	35.258-j3.2727	1.99	92	8	30
T4	34.5 +j8.4	33.752+j7.999	33.851-j14.34	3	91.5	8	30
T5	33.5+j10.2	35.19 +j10.79	35.25-j12.262	3.1	91	8	30
T6	36 +j17.4	35.59+j15.248	35.624-j11.643	3.61	92	8	30

*** 3, Austin A3267**

WLXX-AM License Corp
WRTO (AM) 1200 kHz
20 kW DA-D 4.5 kW DA-N
Facility ID 11196
Chicago, Illinois

Amendment
Tower Self Impedance Model

Tower One Self Impedance
GEOMETRY
Wire coordinates in degrees; other dimensions in meters
Environment: perfect ground

wire	caps	Radius	Angle	Z	radius	segs
1	none	0	0	0	1.5039	2
		0	0	17.6		
2	none	0	0	17.6	1.0188	2
		0	0	35.14		
3	none	0	0	35.14	.6986	2
		0	0	43.9		
4	none	0	0	43.9	.4656	2
		0	0	52.7		
5	none	0	0	52.7	.395	4
		0	0	92.2		
6	none	88.5	207.8	0	1.5039	2
		88.5	207.8	17.6		
7	none	88.5	207.8	17.6	1.0188	2
		88.5	207.8	35.14		
8	none	88.5	207.8	35.14	.6986	2
		88.5	207.8	43.9		
9	none	88.5	207.8	43.9	.4656	2
		88.5	207.8	52.7		
10	none	88.5	207.8	52.7	.395	4
		88.5	207.8	91.		
11	none	125.2	125.8	0	1.5039	2
		125.2	125.8	17.6		
12	none	125.2	125.8	17.6	1.0188	2
		125.2	125.8	35.14		
13	none	125.2	125.8	35.14	.6986	2
		125.2	125.8	43.9		
14	none	125.2	125.8	43.9	.4656	2
		125.2	125.8	52.7		
15	none	125.2	125.8	52.7	.395	4
		125.2	125.8	92.		
16	none	225.	134.7	0	1.5039	2
		225.	134.7	17.6		
17	none	225.	134.7	17.6	1.0188	2
		225.	134.7	35.14		
18	none	225.	134.7	35.14	.6989	2
		225.	134.7	43.9		
19	none	225.	134.7	43.9	.4656	2
		225.	134.7	52.7		
20	none	225.	134.7	52.7	.395	4
		225.	134.7	91.5		
21	none	140.	189.9	0	1.5039	2
		140.	189.9	17.6		
22	none	140.	189.9	17.6	1.0188	2
		140.	189.9	35.14		
23	none	140.	189.9	35.14	.6986	2
		140.	189.9	43.9		
24	none	140.	189.9	43.9	.4656	2
		140.	189.9	52.7		
25	none	140.	189.9	52.7	.395	4
		140.	189.9	91.		
26	none	264.4	143.7	0	1.5039	2

		264.4	143.7	17.6		
27	none	264.4	143.7	17.6	1.0188	2
		264.4	143.7	35.14		
28	none	264.4	143.7	35.14	.6989	2
		264.4	143.7	43.9		
29	none	264.4	143.7	43.9	.4656	2
		264.4	143.7	52.7		
30	none	264.4	143.7	52.7	.395	4
		264.4	143.7	92.		

Number of wires = 30
current nodes = 72

	minimum		maximum	
Individual wires	wire	value	wire	value
segment length	3	4.38	5	9.875
radius	5	.395	1	1.5039

ELECTRICAL DESCRIPTION
Frequencies (MHz)

	frequency		no. of	segment length (wavelengths)	
no.	lowest	step	steps	minimum	maximum
1	1.2	0	1	.0121667	.0274306

Sources

source	node	sector	magnitude	phase	type
1	1	1	27.1085	77.8	voltage

Lumped loads

load	node	resistance (ohms)	reactance (ohms)	inductance (mH)	capacitance (uF)	passive circuit
1	1	0	0	0	0	0
2	13	0	-4,420.97	0	0	0
3	25	0	-4,420.97	0	0	0
4	37	0	-4,420.97	0	0	0
5	49	0	-4,420.97	0	0	0
6	61	0	-4,420.97	0	0	0

IMPEDANCE
normalization = 50.

freq (MHz)	resist (ohms)	react (ohms)	imped (ohms)	phase (deg)	VSWR	S11 dB	S12 dB
source = 1; node 1, sector 1							
1.2	34.223	-6.3002	34.798	349.6	1.5036	-13.93	-.17938

CURRENT rms
Frequency = 1.2 MHz
Input power = 10.3847 watts
Efficiency = 100. %
coordinates in degrees

current no.	X	Y	Z	mag (amps)	phase (deg)	real (amps)	imaginary (amps)
GND	0	0	0	.550858	88.2	.0170046	.550595
2	0	0	8.8	.538173	84.	.0564807	.535201
J1	0	0	17.6	.515141	82.2	.0700969	.510349

2J1	0	0	17.6	.515141	82.2	.0700969	.510349
4	0	0	26.37	.486343	81.	.0761816	.480339
J2	0	0	35.14	.442005	79.9	.0777216	.435118
2J1	0	0	35.14	.442005	79.9	.0777216	.435118
6	0	0	39.52	.420883	79.5	.0768399	.41381
J3	0	0	43.9	.394555	79.1	.0749265	.387376
2J1	0	0	43.9	.394555	79.1	.0749265	.387376
8	0	0	48.3	.37142	78.7	.0725873	.364258
J4	0	0	52.7	.344381	78.4	.0692869	.337339
2J1	0	0	52.7	.344381	78.4	.0692869	.337339
10	0	0	62.575	.278417	77.7	.0591725	.272056
11	0	0	72.45	.200582	77.1	.0447389	.195529
12	0	0	82.325	.111839	76.5	.0260602	.10876
END	0	0	92.2	0	0	0	0
GND	-78.2854	-41.2752	0	2.8E-03	306.9	1.68E-03	-2.24E-03
14	-78.2854	-41.2752	8.8	.0288482	306.9	.0173395	-.0230556
J6	-78.2854	-41.2752	17.6	.0378889	307.1	.022861	-.030215
2J1	-78.2854	-41.2752	17.6	.0378889	307.1	.022861	-.030215
16	-78.2854	-41.2752	26.37	.0420212	307.3	.0254486	-.0334387
J7	-78.2854	-41.2752	35.14	.0432989	307.5	.0263493	-.0343585
2J1	-78.2854	-41.2752	35.14	.0432989	307.5	.0263493	-.0343585
18	-78.2854	-41.2752	39.52	.0428764	307.6	.0261389	-.0339874
J8	-78.2854	-41.2752	43.9	.0418364	307.7	.0255595	-.033121
2J1	-78.2854	-41.2752	43.9	.0418364	307.7	.0255595	-.033121
20	-78.2854	-41.2752	48.3	.0405116	307.7	.0247929	-.0320391
J9	-78.2854	-41.2752	52.7	.0386125	307.8	.0236735	-.030504
2J1	-78.2854	-41.2752	52.7	.0386125	307.8	.0236735	-.030504
22	-78.2854	-41.2752	62.275	.0329405	308.	.0202863	-.0259527
23	-78.2854	-41.2752	71.85	.024875	308.2	.0153864	-.0195454
24	-78.2854	-41.2752	81.425	.014479	308.4	8.99E-03	-.0113467
END	-78.2854	-41.2752	91.	0	0	0	0
GND	-73.2367	101.545	0	2.35E-03	281.6	4.72E-04	-2.3E-03
26	-73.2367	101.545	8.8	.0242819	281.6	4.88E-03	-.0237874
J11	-73.2367	101.545	17.6	.0320153	281.6	6.41E-03	-.0313664
2J1	-73.2367	101.545	17.6	.0320153	281.6	6.41E-03	-.0313664
28	-73.2367	101.545	26.37	.0356465	281.5	7.12E-03	-.0349276
J12	-73.2367	101.545	35.14	.0369302	281.5	7.35E-03	-.0361904
2J1	-73.2367	101.545	35.14	.0369302	281.5	7.35E-03	-.0361904
30	-73.2367	101.545	39.52	.0366628	281.5	7.29E-03	-.0359316
J13	-73.2367	101.545	43.9	.0358866	281.4	7.11E-03	-.0351747
2J1	-73.2367	101.545	43.9	.0358866	281.4	7.11E-03	-.0351747
32	-73.2367	101.545	48.3	.034849	281.4	6.89E-03	-.0341608
J14	-73.2367	101.545	52.7	.0333334	281.4	6.57E-03	-.0326791
2J1	-73.2367	101.545	52.7	.0333334	281.4	6.57E-03	-.0326791
34	-73.2367	101.545	62.525	.0285561	281.3	5.6E-03	-.0280011
35	-73.2367	101.545	72.35	.0216312	281.2	4.22E-03	-.0212162
36	-73.2367	101.545	82.175	.0126134	281.1	2.44E-03	-.0123754
END	-73.2367	101.545	92.	0	0	0	0
GND	-158.264	159.93	0	1.52E-03	171.7	-1.5E-03	2.2E-04
38	-158.264	159.93	8.8	.0157101	171.6	-.0155433	2.28E-03
J16	-158.264	159.93	17.6	.0207434	171.6	-.0205202	3.03E-03
2J1	-158.264	159.93	17.6	.0207434	171.6	-.0205202	3.03E-03
40	-158.264	159.93	26.37	.0231338	171.5	-.0228806	3.41E-03
J17	-158.264	159.93	35.14	.0240244	171.4	-.0237541	3.59E-03
2J1	-158.264	159.93	35.14	.0240244	171.4	-.0237541	3.59E-03
42	-158.264	159.93	39.52	.0238769	171.3	-.0236043	3.6E-03
J18	-158.264	159.93	43.9	.0234023	171.3	-.0231301	3.56E-03

2J1	-158.264	159.93	43.9	.0234023	171.3	-.0231301	3.56E-03
44	-158.264	159.93	48.3	.0227503	171.2	-.0224813	3.49E-03
J19	-158.264	159.93	52.7	.0217858	171.1	-.021523	3.37E-03
2J1	-158.264	159.93	52.7	.0217858	171.1	-.021523	3.37E-03
46	-158.264	159.93	62.4	.0187487	170.9	-.0185118	2.97E-03
47	-158.264	159.93	72.1	.0142883	170.6	-.0140973	2.33E-03
48	-158.264	159.93	81.8	8.4E-03	170.3	-8.28E-03	1.41E-03
END	-158.264	159.93	91.5	0	0	0	0
GND	-137.915	-24.0701	0	2.53E-03	259.8	-4.48E-04	-2.49E-03
50	-137.915	-24.0701	8.8	.026165	259.8	-4.65E-03	-.025748
J21	-137.915	-24.0701	17.6	.034463	259.7	-6.19E-03	-.0339022
2J1	-137.915	-24.0701	17.6	.034463	259.7	-6.19E-03	-.0339022
52	-137.915	-24.0701	26.37	.0383311	259.5	-6.95E-03	-.0376952
J22	-137.915	-24.0701	35.14	.0396479	259.4	-7.27E-03	-.0389748
2J1	-137.915	-24.0701	35.14	.0396479	259.4	-7.27E-03	-.0389748
54	-137.915	-24.0701	39.52	.0393275	259.4	-7.25E-03	-.0386527
J23	-137.915	-24.0701	43.9	.0384505	259.3	-7.13E-03	-.037783
2J1	-137.915	-24.0701	43.9	.0384505	259.3	-7.13E-03	-.037783
56	-137.915	-24.0701	48.3	.0372956	259.3	-6.95E-03	-.0366419
J24	-137.915	-24.0701	52.7	.035615	259.2	-6.67E-03	-.034984
2J1	-137.915	-24.0701	52.7	.035615	259.2	-6.67E-03	-.034984
58	-137.915	-24.0701	62.275	.0305087	259.1	-5.77E-03	-.0299581
59	-137.915	-24.0701	71.85	.0231409	259.	-4.42E-03	-.0227151
60	-137.915	-24.0701	81.425	.0135327	258.9	-2.61E-03	-.0132785
END	-137.915	-24.0701	91.	0	0	0	0
GND	-213.087	156.528	0	1.64E-03	130.2	-1.06E-03	1.25E-03
62	-213.087	156.528	8.8	.0169335	130.1	-.0109138	.0129473
J26	-213.087	156.528	17.6	.0223865	130.	-.0143864	.0171518
2J1	-213.087	156.528	17.6	.0223865	130.	-.0143864	.0171518
64	-213.087	156.528	26.37	.0249983	129.9	-.0160212	.0191895
J27	-213.087	156.528	35.14	.0260102	129.7	-.0166145	.0200123
2J1	-213.087	156.528	35.14	.0260102	129.7	-.0166145	.0200123
66	-213.087	156.528	39.52	.0258742	129.6	-.016504	.0199272
J28	-213.087	156.528	43.9	.0253898	129.6	-.0161689	.0195758
2J1	-213.087	156.528	43.9	.0253898	129.6	-.0161689	.0195758
68	-213.087	156.528	48.3	.0247097	129.5	-.0157152	.0190683
J29	-213.087	156.528	52.7	.0236958	129.4	-.0150483	.018304
2J1	-213.087	156.528	52.7	.0236958	129.4	-.0150483	.018304
70	-213.087	156.528	62.525	.020425	129.3	-.0129332	.0158086
71	-213.087	156.528	72.35	.0155833	129.1	-9.84E-03	.0120861
72	-213.087	156.528	82.175	9.16E-03	129.	-5.76E-03	7.12E-03
END	-213.087	156.528	92.	0	0	0	0

Tower Two Self Impedance
GEOMETRY
Wire coordinates in degrees; other dimensions in meters
Environment: perfect ground

wire	caps	Radius	Angle	Z	radius	segs
1	none	0	0	0	1.5039	2
		0	0	17.6		
2	none	0	0	17.6	1.0188	2
		0	0	35.14		
3	none	0	0	35.14	.6986	2
		0	0	43.9		
4	none	0	0	43.9	.4656	2
		0	0	52.7		
5	none	0	0	52.7	.395	4
		0	0	92.2		
6	none	88.5	207.8	0	1.5039	2
		88.5	207.8	17.6		
7	none	88.5	207.8	17.6	1.0188	2
		88.5	207.8	35.14		
8	none	88.5	207.8	35.14	.6986	2
		88.5	207.8	43.9		
9	none	88.5	207.8	43.9	.4656	2
		88.5	207.8	52.7		
10	none	88.5	207.8	52.7	.395	4
		88.5	207.8	91.		
11	none	125.2	125.8	0	1.5039	2
		125.2	125.8	17.6		
12	none	125.2	125.8	17.6	1.0188	2
		125.2	125.8	35.14		
13	none	125.2	125.8	35.14	.6986	2
		125.2	125.8	43.9		
14	none	125.2	125.8	43.9	.4656	2
		125.2	125.8	52.7		
15	none	125.2	125.8	52.7	.395	4
		125.2	125.8	92.		
16	none	225.	134.7	0	1.5039	2
		225.	134.7	17.6		
17	none	225.	134.7	17.6	1.0188	2
		225.	134.7	35.14		
18	none	225.	134.7	35.14	.6989	2
		225.	134.7	43.9		
19	none	225.	134.7	43.9	.4656	2
		225.	134.7	52.7		
20	none	225.	134.7	52.7	.395	4
		225.	134.7	91.5		
21	none	140.	189.9	0	1.5039	2
		140.	189.9	17.6		
22	none	140.	189.9	17.6	1.0188	2
		140.	189.9	35.14		
23	none	140.	189.9	35.14	.6986	2
		140.	189.9	43.9		
24	none	140.	189.9	43.9	.4656	2
		140.	189.9	52.7		
25	none	140.	189.9	52.7	.395	4
		140.	189.9	91.		

26	none	264.4	143.7	0	1.5039	2
		264.4	143.7	17.6		
27	none	264.4	143.7	17.6	1.0188	2
		264.4	143.7	35.14		
28	none	264.4	143.7	35.14	.6989	2
		264.4	143.7	43.9		
29	none	264.4	143.7	43.9	.4656	2
		264.4	143.7	52.7		
30	none	264.4	143.7	52.7	.395	4
		264.4	143.7	92.		

Number of wires = 30
current nodes = 72

	minimum		maximum	
Individual wires	wire	value	wire	value
segment length	3	4.38	5	9.875
radius	5	.395	1	1.5039

ELECTRICAL DESCRIPTION
Frequencies (MHz)

	frequency		no. of	segment length (wavelengths)	
no.	lowest	step	steps	minimum	maximum
1	1.2	0	1	.0121667	.0274306

Sources

source	node	sector	magnitude	phase	type
1	13	1	27.1085	77.8	voltage

Lumped loads

load	node	resistance (ohms)	reactance (ohms)	inductance (mH)	capacitance (uF)	passive circuit
1	1	0	-4,420.97	0	0	0
2	13	0	0	0	0	0
3	25	0	-4,420.97	0	0	0
4	37	0	-4,420.97	0	0	0
5	49	0	-4,420.97	0	0	0
6	61	0	-4,420.97	0	0	0

IMPEDANCE
normalization = 50.

freq (MHz)	resist (ohms)	react (ohms)	imped (ohms)	phase (deg)	VSWR	S11 dB	S12 dB
source = 1; node 13, sector 1							
1.2	31.667	-14.623	34.88	335.2	1.7881	-10.975	-.36162

CURRENT rms
Frequency = 1.2 MHz
Input power = 9.56373 watts
Efficiency = 100. %
coordinates in degrees

current no.	X	Y	Z	mag (amps)	phase (deg)	real (amps)	imaginary (amps)
GND	0	0	0	2.79E-03	321.2	2.18E-03	-1.75E-03
2	0	0	8.8	.0288609	321.3	.0225093	-.0180633

J1	0	0	17.6	.0379853	321.4	.029688	-.0236962
2J1	0	0	17.6	.0379853	321.4	.029688	-.0236962
4	0	0	26.37	.0422214	321.6	.0330684	-.0262513
J2	0	0	35.14	.0436486	321.8	.0342848	-.027014
2J1	0	0	35.14	.0436486	321.8	.0342848	-.027014
6	0	0	39.52	.043294	321.8	.0340439	-.0267467
J3	0	0	43.9	.0423354	321.9	.0333354	-.0260968
2J1	0	0	43.9	.0423354	321.9	.0333354	-.0260968
8	0	0	48.3	.0410796	322.	.032383	-.025276
J4	0	0	52.7	.0392617	322.1	.0309875	-.0241092
2J1	0	0	52.7	.0392617	322.1	.0309875	-.0241092
10	0	0	62.575	.0335568	322.4	.02657	-.0204963
11	0	0	72.45	.0253524	322.6	.0201406	-.0153981
12	0	0	82.325	.0147405	322.9	.0117498	-8.9E-03
END	0	0	92.2	0	0	0	0
GND	-78.2854	-41.2752	0	.549554	102.6	-.119755	.536347
14	-78.2854	-41.2752	8.8	.526869	98.6	-.0785992	.520973
J6	-78.2854	-41.2752	17.6	.499742	96.9	-.0596108	.496174
2J1	-78.2854	-41.2752	17.6	.499742	96.9	-.0596108	.496174
16	-78.2854	-41.2752	26.37	.468563	95.7	-.0464747	.466253
J7	-78.2854	-41.2752	35.14	.422559	94.6	-.0338765	.421199
2J1	-78.2854	-41.2752	35.14	.422559	94.6	-.0338765	.421199
18	-78.2854	-41.2752	39.52	.401056	94.2	-.0294548	.399973
J8	-78.2854	-41.2752	43.9	.37447	93.8	-.0247383	.373652
2J1	-78.2854	-41.2752	43.9	.37447	93.8	-.0247383	.373652
20	-78.2854	-41.2752	48.3	.351286	93.5	-.0212399	.350643
J9	-78.2854	-41.2752	52.7	.324329	93.1	-.0177093	.323845
2J1	-78.2854	-41.2752	52.7	.324329	93.1	-.0177093	.323845
22	-78.2854	-41.2752	62.275	.261322	92.5	-.0113111	.261077
23	-78.2854	-41.2752	71.85	.187808	91.9	-6.13E-03	.187708
24	-78.2854	-41.2752	81.425	.104594	91.3	-2.34E-03	.104568
END	-78.2854	-41.2752	91.	0	0	0	0
GND	-73.2367	101.545	0	2.12E-03	271.7	6.32E-05	-2.12E-03
26	-73.2367	101.545	8.8	.0219103	271.7	6.39E-04	-.021901
J11	-73.2367	101.545	17.6	.0289102	271.6	8.01E-04	-.0288991
2J1	-73.2367	101.545	17.6	.0289102	271.6	8.01E-04	-.0288991
28	-73.2367	101.545	26.37	.0322136	271.5	8.44E-04	-.0322025
J12	-73.2367	101.545	35.14	.0334076	271.4	8.09E-04	-.0333979
2J1	-73.2367	101.545	35.14	.0334076	271.4	8.09E-04	-.0333979
30	-73.2367	101.545	39.52	.0331811	271.3	7.69E-04	-.0331722
J13	-73.2367	101.545	43.9	.0324966	271.3	7.15E-04	-.0324887
2J1	-73.2367	101.545	43.9	.0324966	271.3	7.15E-04	-.0324887
32	-73.2367	101.545	48.3	.0315716	271.2	6.62E-04	-.0315647
J14	-73.2367	101.545	52.7	.0302148	271.1	5.96E-04	-.0302089
2J1	-73.2367	101.545	52.7	.0302148	271.1	5.96E-04	-.0302089
34	-73.2367	101.545	62.525	.0259151	271.	4.46E-04	-.0259113
35	-73.2367	101.545	72.35	.0196565	270.8	2.8E-04	-.0196545
36	-73.2367	101.545	82.175	.0114784	270.6	1.24E-04	-.0114777
END	-73.2367	101.545	92.	0	0	0	0
GND	-158.264	159.93	0	1.6E-03	189.6	-1.58E-03	-2.66E-04
38	-158.264	159.93	8.8	.0165611	189.5	-.0163328	-2.74E-03
J16	-158.264	159.93	17.6	.0218614	189.4	-.0215654	-3.59E-03
2J1	-158.264	159.93	17.6	.0218614	189.4	-.0215654	-3.59E-03
40	-158.264	159.93	26.37	.0243752	189.3	-.0240517	-3.96E-03
J17	-158.264	159.93	35.14	.0253079	189.2	-.0249818	-4.05E-03
2J1	-158.264	159.93	35.14	.0253079	189.2	-.0249818	-4.05E-03
42	-158.264	159.93	39.52	.0251505	189.1	-.0248312	-4.E-03

J18	-158.264	159.93	43.9	.0246486	189.1	-.0243413	-3.88E-03
2J1	-158.264	159.93	43.9	.0246486	189.1	-.0243413	-3.88E-03
44	-158.264	159.93	48.3	.0239608	189.	-.0236668	-3.74E-03
J19	-158.264	159.93	52.7	.0229438	188.9	-.0226677	-3.55E-03
2J1	-158.264	159.93	52.7	.0229438	188.9	-.0226677	-3.55E-03
46	-158.264	159.93	62.4	.0197446	188.7	-.0195174	-2.99E-03
47	-158.264	159.93	72.1	.0150476	188.5	-.0148837	-2.21E-03
48	-158.264	159.93	81.8	8.84E-03	188.2	-8.75E-03	-1.26E-03
END	-158.264	159.93	91.5	0	0	0	0
GND	-137.915	-24.0701	0	3.41E-03	347.7	3.33E-03	-7.24E-04
50	-137.915	-24.0701	8.8	.0351507	347.9	.0343748	-7.34E-03
J21	-137.915	-24.0701	17.6	.0461558	348.4	.0452113	-9.29E-03
2J1	-137.915	-24.0701	17.6	.0461558	348.4	.0452113	-9.29E-03
52	-137.915	-24.0701	26.37	.0511841	348.8	.0502171	-9.9E-03
J22	-137.915	-24.0701	35.14	.0527441	349.5	.0518556	-9.64E-03
2J1	-137.915	-24.0701	35.14	.0527441	349.5	.0518556	-9.64E-03
54	-137.915	-24.0701	39.52	.0522319	349.7	.0513952	-9.31E-03
J23	-137.915	-24.0701	43.9	.0509711	350.	.0502042	-8.81E-03
2J1	-137.915	-24.0701	43.9	.0509711	350.	.0502042	-8.81E-03
56	-137.915	-24.0701	48.3	.0493638	350.3	.0486605	-8.3E-03
J24	-137.915	-24.0701	52.7	.0470581	350.6	.0464285	-7.67E-03
2J1	-137.915	-24.0701	52.7	.0470581	350.6	.0464285	-7.67E-03
58	-137.915	-24.0701	62.275	.0401742	351.3	.0397145	-6.06E-03
59	-137.915	-24.0701	71.85	.0303677	352.1	.0300786	-4.18E-03
60	-137.915	-24.0701	81.425	.0176997	352.9	.0175637	-2.19E-03
END	-137.915	-24.0701	91.	0	0	0	0
GND	-213.087	156.528	0	1.57E-03	168.3	-1.54E-03	3.18E-04
62	-213.087	156.528	8.8	.0162426	168.2	-.0159009	3.31E-03
J26	-213.087	156.528	17.6	.0214624	168.1	-.0210007	4.43E-03
2J1	-213.087	156.528	17.6	.0214624	168.1	-.0210007	4.43E-03
64	-213.087	156.528	26.37	.0239566	168.	-.0234301	4.99E-03
J27	-213.087	156.528	35.14	.0249157	167.8	-.0243532	5.26E-03
2J1	-213.087	156.528	35.14	.0249157	167.8	-.0243532	5.26E-03
66	-213.087	156.528	39.52	.0247819	167.7	-.0242157	5.27E-03
J28	-213.087	156.528	43.9	.0243146	167.6	-.0237515	5.2E-03
2J1	-213.087	156.528	43.9	.0243146	167.6	-.0237515	5.2E-03
68	-213.087	156.528	48.3	.0236611	167.6	-.023107	5.09E-03
J29	-213.087	156.528	52.7	.0226884	167.5	-.0221503	4.91E-03
2J1	-213.087	156.528	52.7	.0226884	167.5	-.0221503	4.91E-03
70	-213.087	156.528	62.525	.0195549	167.3	-.0190787	4.29E-03
71	-213.087	156.528	72.35	.0149197	167.1	-.0145458	3.32E-03
72	-213.087	156.528	82.175	8.77E-03	166.9	-8.55E-03	1.98E-03
END	-213.087	156.528	92.	0	0	0	0

Tower Three Self Impedance
GEOMETRY
Wire coordinates in degrees; other dimensions in meters
Environment: perfect ground

wire	caps	Radius	Angle	Z	radius	segs
1	none	0	0	0	1.5039	2
		0	0	17.6		
2	none	0	0	17.6	1.0188	2
		0	0	35.14		
3	none	0	0	35.14	.6986	2
		0	0	43.9		
4	none	0	0	43.9	.4656	2
		0	0	52.7		
5	none	0	0	52.7	.395	4
		0	0	92.2		
6	none	88.5	207.8	0	1.5039	2
		88.5	207.8	17.6		
7	none	88.5	207.8	17.6	1.0188	2
		88.5	207.8	35.14		
8	none	88.5	207.8	35.14	.6986	2
		88.5	207.8	43.9		
9	none	88.5	207.8	43.9	.4656	2
		88.5	207.8	52.7		
10	none	88.5	207.8	52.7	.395	4
		88.5	207.8	91.		
11	none	125.2	125.8	0	1.5039	2
		125.2	125.8	17.6		
12	none	125.2	125.8	17.6	1.0188	2
		125.2	125.8	35.14		
13	none	125.2	125.8	35.14	.6986	2
		125.2	125.8	43.9		
14	none	125.2	125.8	43.9	.4656	2
		125.2	125.8	52.7		
15	none	125.2	125.8	52.7	.395	4
		125.2	125.8	92.		
16	none	225.	134.7	0	1.5039	2
		225.	134.7	17.6		
17	none	225.	134.7	17.6	1.0188	2
		225.	134.7	35.14		
18	none	225.	134.7	35.14	.6989	2
		225.	134.7	43.9		
19	none	225.	134.7	43.9	.4656	2
		225.	134.7	52.7		
20	none	225.	134.7	52.7	.395	4
		225.	134.7	91.5		
21	none	140.	189.9	0	1.5039	2
		140.	189.9	17.6		
22	none	140.	189.9	17.6	1.0188	2
		140.	189.9	35.14		
23	none	140.	189.9	35.14	.6986	2
		140.	189.9	43.9		
24	none	140.	189.9	43.9	.4656	2
		140.	189.9	52.7		
25	none	140.	189.9	52.7	.395	4
		140.	189.9	91.		
26	none	264.4	143.7	0	1.5039	2

```
           264.4        143.7        17.6
 27   none 264.4        143.7        17.6         1.0188       2
           264.4        143.7        35.14
 28   none 264.4        143.7        35.14        .6989        2
           264.4        143.7        43.9
 29   none 264.4        143.7        43.9         .4656        2
           264.4        143.7        52.7
 30   none 264.4        143.7        52.7         .395         4
           264.4        143.7        92.

Number of wires          =  30
          current nodes  =  72

                         minimum                  maximum
Individual wires      wire    value             wire  value
segment length         3      4.38               5    9.875
radius                 5      .395               1    1.5039


ELECTRICAL DESCRIPTION
Frequencies (MHz)
     frequency                 no. of  segment length (wavelengths)
 no. lowest       step          steps   minimum        maximum
 1   1.2          0              1      .0121667       .0274306

Sources
source node    sector  magnitude      phase          type
 1      25      1      27.1085        77.8           voltage

Lumped loads
             resistance    reactance     inductance  capacitance passive
load  node   (ohms)        (ohms)        (mH)        (uF)        circuit
 1     1     0             -4,420.97     0           0            0
 2     13    0             -4,420.97     0           0            0
 3     25    0             0             0           0            0
 4     37    0             -4,420.97     0           0            0
 5     49    0             -4,420.97     0           0            0
 6     61    0             -4,420.97     0           0            0

   normalization = 50.
freq     resist   react    imped    phase    VSWR    S11      S12
(MHz)    (ohms)   (ohms)   (ohms)   (deg)            dB       dB
source =  1; node 25, sector 1
1.2      35.258   -3.2727  35.41    354.7    1.4301  -15.041  -.13822


CURRENT rms
Frequency   = 1.2 MHz
Input power = 10.3323 watts
Efficiency  = 100. %
coordinates in degrees
current                                  mag       phase  real       imaginary
no.    X         Y         Z            (amps)    (deg)  (amps)     (amps)
GND    0         0         0            2.31E-03  276.5  2.6E-04    -2.29E-03
 2     0         0         8.8          .0238503  276.5  2.69E-03   -.0236984
J1     0         0         17.6         .0314592  276.4  3.53E-03   -.0312601
2J1    0         0         17.6         .0314592  276.4  3.53E-03   -.0312601
```

4	0	0	26.37	.0350437	276.4	3.92E-03	-.0348235
J2	0	0	35.14	.0363331	276.4	4.05E-03	-.0361071
2J1	0	0	35.14	.0363331	276.4	4.05E-03	-.0361071
6	0	0	39.52	.036084	276.4	4.E-03	-.0358611
J3	0	0	43.9	.0353383	276.3	3.91E-03	-.0351217
2J1	0	0	43.9	.0353383	276.3	3.91E-03	-.0351217
8	0	0	48.3	.0343332	276.3	3.78E-03	-.0341243
J4	0	0	52.7	.0328609	276.3	3.6E-03	-.0326629
2J1	0	0	52.7	.0328609	276.3	3.6E-03	-.0326629
10	0	0	62.575	.0281751	276.2	3.06E-03	-.0280079
11	0	0	72.45	.0213588	276.2	2.3E-03	-.0212347
12	0	0	82.325	.0124626	276.1	1.32E-03	-.0123921
END	0	0	92.2	0	0	0	0
GND	-78.2854	-41.2752	0	2.08E-03	252.3	-6.34E-04	-1.98E-03
14	-78.2854	-41.2752	8.8	.0215075	252.2	-6.56E-03	-.0204823
J6	-78.2854	-41.2752	17.6	.0283204	252.2	-8.68E-03	-.0269585
2J1	-78.2854	-41.2752	17.6	.0283204	252.2	-8.68E-03	-.0269585
16	-78.2854	-41.2752	26.37	.0314919	252.1	-9.69E-03	-.0299639
J7	-78.2854	-41.2752	35.14	.0325672	252.	-.0100784	-.0309685
2J1	-78.2854	-41.2752	35.14	.0325672	252.	-.0100784	-.0309685
18	-78.2854	-41.2752	39.52	.0323023	251.9	-.0100249	-.0307074
J8	-78.2854	-41.2752	43.9	.031581	251.9	-9.83E-03	-.0300111
2J1	-78.2854	-41.2752	43.9	.031581	251.9	-9.83E-03	-.0300111
20	-78.2854	-41.2752	48.3	.0306322	251.8	-9.56E-03	-.0291008
J9	-78.2854	-41.2752	52.7	.0292526	251.7	-9.16E-03	-.0277802
2J1	-78.2854	-41.2752	52.7	.0292526	251.7	-9.16E-03	-.0277802
22	-78.2854	-41.2752	62.275	.0250621	251.6	-7.9E-03	-.023784
23	-78.2854	-41.2752	71.85	.0190153	251.5	-6.04E-03	-.0180308
24	-78.2854	-41.2752	81.425	.0111249	251.3	-3.56E-03	-.0105391
END	-78.2854	-41.2752	91.	0	0	0	0
GND	-73.2367	101.545	0	.54134	83.1	.0650058	.537422
26	-73.2367	101.545	8.8	.532397	78.7	.103883	.522164
J11	-73.2367	101.545	17.6	.510985	76.9	.115582	.497741
2J1	-73.2367	101.545	17.6	.510985	76.9	.115582	.497741
28	-73.2367	101.545	26.37	.48322	75.7	.119157	.468298
J12	-73.2367	101.545	35.14	.439758	74.6	.116768	.423972
2J1	-73.2367	101.545	35.14	.439758	74.6	.116768	.423972
30	-73.2367	101.545	39.52	.418906	74.2	.114003	.403095
J13	-73.2367	101.545	43.9	.39284	73.8	.109739	.377201
2J1	-73.2367	101.545	43.9	.39284	73.8	.109739	.377201
32	-73.2367	101.545	48.3	.369876	73.5	.10533	.354562
J14	-73.2367	101.545	52.7	.342984	73.1	.0996073	.328202
2J1	-73.2367	101.545	52.7	.342984	73.1	.0996073	.328202
34	-73.2367	101.545	62.525	.277562	72.5	.0836684	.264651
35	-73.2367	101.545	72.35	.200173	71.8	.0623838	.190204
36	-73.2367	101.545	82.175	.111743	71.3	.0359046	.105817
END	-73.2367	101.545	92.	0	0	0	0
GND	-158.264	159.93	0	2.67E-03	295.9	1.17E-03	-2.4E-03
38	-158.264	159.93	8.8	.0275979	295.9	.0120733	-.0248169
J16	-158.264	159.93	17.6	.0363048	296.1	.0159499	-.0326135
2J1	-158.264	159.93	17.6	.0363048	296.1	.0159499	-.0326135
40	-158.264	159.93	26.37	.0403354	296.2	.0177889	-.0362008
J17	-158.264	159.93	35.14	.0416739	296.3	.0184635	-.0373606
2J1	-158.264	159.93	35.14	.0416739	296.3	.0184635	-.0373606
42	-158.264	159.93	39.52	.0413222	296.3	.0183344	-.037032
J18	-158.264	159.93	43.9	.0403887	296.4	.0179501	-.0361807
2J1	-158.264	159.93	43.9	.0403887	296.4	.0179501	-.0361807

44	-158.264	159.93	48.3	.0391716	296.4	.0174306	-.0350797
J19	-158.264	159.93	52.7	.03741	296.5	.0166657	-.0334928
2J1	-158.264	159.93	52.7	.03741	296.5	.0166657	-.0334928
46	-158.264	159.93	62.4	.0320029	296.5	.0142977	-.0286315
47	-158.264	159.93	72.1	.0242278	296.6	.0108471	-.021664
48	-158.264	159.93	81.8	.0141324	296.6	6.34E-03	-.0126325
END	-158.264	159.93	91.5	0	0	0	0
GND	-137.915	-24.0701	0	1.87E-03	254.7	-4.95E-04	-1.81E-03
50	-137.915	-24.0701	8.8	.0193498	254.7	-5.12E-03	-.0186601
J21	-137.915	-24.0701	17.6	.0254685	254.6	-6.77E-03	-.0245521
2J1	-137.915	-24.0701	17.6	.0254685	254.6	-6.77E-03	-.0245521
52	-137.915	-24.0701	26.37	.028309	254.5	-7.56E-03	-.0272805
J22	-137.915	-24.0701	35.14	.0292598	254.4	-7.87E-03	-.0281827
2J1	-137.915	-24.0701	35.14	.0292598	254.4	-7.87E-03	-.0281827
54	-137.915	-24.0701	39.52	.0290152	254.4	-7.83E-03	-.02794
J23	-137.915	-24.0701	43.9	.0283595	254.3	-7.68E-03	-.0273003
2J1	-137.915	-24.0701	43.9	.0283595	254.3	-7.68E-03	-.0273003
56	-137.915	-24.0701	48.3	.0275013	254.2	-7.47E-03	-.0264672
J24	-137.915	-24.0701	52.7	.026256	254.2	-7.16E-03	-.0252608
2J1	-137.915	-24.0701	52.7	.026256	254.2	-7.16E-03	-.0252608
58	-137.915	-24.0701	62.275	.0224819	254.	-6.18E-03	-.0216161
59	-137.915	-24.0701	71.85	.0170468	253.9	-4.73E-03	-.0163781
60	-137.915	-24.0701	81.425	9.97E-03	253.7	-2.79E-03	-9.57E-03
END	-137.915	-24.0701	91.	0	0	0	0
GND	-213.087	156.528	0	2.4E-03	251.8	-7.49E-04	-2.28E-03
62	-213.087	156.528	8.8	.0248139	251.7	-7.78E-03	-.0235641
J26	-213.087	156.528	17.6	.0327274	251.6	-.0103272	-.0310553
2J1	-213.087	156.528	17.6	.0327274	251.6	-.0103272	-.0310553
64	-213.087	156.528	26.37	.0364601	251.5	-.0115773	-.0345732
J27	-213.087	156.528	35.14	.0378176	251.3	-.0120944	-.0358314
2J1	-213.087	156.528	35.14	.0378176	251.3	-.0120944	-.0358314
66	-213.087	156.528	39.52	.0375678	251.3	-.0120517	-.0355823
J28	-213.087	156.528	43.9	.036804	251.2	-.0118462	-.0348454
2J1	-213.087	156.528	43.9	.036804	251.2	-.0118462	-.0348454
68	-213.087	156.528	48.3	.0357685	251.2	-.011543	-.0338548
J29	-213.087	156.528	52.7	.0342467	251.1	-.011084	-.0324034
2J1	-213.087	156.528	52.7	.0342467	251.1	-.011084	-.0324034
70	-213.087	156.528	62.525	.0294144	251.	-9.57E-03	-.0278155
71	-213.087	156.528	72.35	.022353	250.9	-7.3E-03	-.0211262
72	-213.087	156.528	82.175	.0130835	250.8	-4.29E-03	-.0123587
END	-213.087	156.528	92.	0	0	0	0

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

wire	caps	Radius	Angle	Z	radius	segs
1	none	0	0	0	1.5039	2
		0	0	17.6		
2	none	0	0	17.6	1.0188	2
		0	0	35.14		
3	none	0	0	35.14	.6986	2
		0	0	43.9		
4	none	0	0	43.9	.4656	2
		0	0	52.7		
5	none	0	0	52.7	.395	4
		0	0	92.2		
6	none	88.5	207.8	0	1.5039	2
		88.5	207.8	17.6		
7	none	88.5	207.8	17.6	1.0188	2
		88.5	207.8	35.14		
8	none	88.5	207.8	35.14	.6986	2
		88.5	207.8	43.9		
9	none	88.5	207.8	43.9	.4656	2
		88.5	207.8	52.7		
10	none	88.5	207.8	52.7	.395	4
		88.5	207.8	91.		
11	none	125.2	125.8	0	1.5039	2
		125.2	125.8	17.6		
12	none	125.2	125.8	17.6	1.0188	2
		125.2	125.8	35.14		
13	none	125.2	125.8	35.14	.6986	2
		125.2	125.8	43.9		
14	none	125.2	125.8	43.9	.4656	2
		125.2	125.8	52.7		
15	none	125.2	125.8	52.7	.395	4
		125.2	125.8	92.		
16	none	225.	134.7	0	1.5039	2
		225.	134.7	17.6		
17	none	225.	134.7	17.6	1.0188	2
		225.	134.7	35.14		
18	none	225.	134.7	35.14	.6989	2
		225.	134.7	43.9		
19	none	225.	134.7	43.9	.4656	2
		225.	134.7	52.7		
20	none	225.	134.7	52.7	.395	4
		225.	134.7	91.5		
21	none	140.	189.9	0	1.5039	2
		140.	189.9	17.6		
22	none	140.	189.9	17.6	1.0188	2
		140.	189.9	35.14		
23	none	140.	189.9	35.14	.6986	2
		140.	189.9	43.9		
24	none	140.	189.9	43.9	.4656	2
		140.	189.9	52.7		
25	none	140.	189.9	52.7	.395	4
		140.	189.9	91.		
26	none	264.4	143.7	0	1.5039	2

		264.4	143.7	17.6			
27	none	264.4	143.7	17.6	1.0188	2	
		264.4	143.7	35.14			
28	none	264.4	143.7	35.14	.6989	2	
		264.4	143.7	43.9			
29	none	264.4	143.7	43.9	.4656	2	
		264.4	143.7	52.7			
30	none	264.4	143.7	52.7	.395	4	
		264.4	143.7	92.			

Number of wires = 30
current nodes = 72

	minimum		maximum	
Individual wires	wire	value	wire	value
segment length	3	4.38	5	9.875
radius	5	.395	1	1.5039

ELECTRICAL DESCRIPTION
Frequencies (MHz)

	frequency		no. of	segment length (wavelengths)	
no.	lowest	step	steps	minimum	maximum
1	1.2	0	1	.0121667	.0274306

Sources

source	node	sector	magnitude	phase	type
1	37	1	27.1085	77.8	voltage

Lumped loads

load	node	resistance (ohms)	reactance (ohms)	inductance (mH)	capacitance (uF)	passive circuit
1	1	0	-4,420.97	0	0	0
2	13	0	-4,320.97	0	0	0
3	25	0	-4,420.97	0	0	0
4	37	0	0	0	0	0
5	49	0	-4,420.97	0	0	0
6	61	0	-4,420.97	0	0	0

IMPEDANCE
normalization = 50.

freq (MHz)	resist (ohms)	react (ohms)	imped (ohms)	phase (deg)	VSWR	S11 dB	S12 dB
source = 1; node 37, sector 1							
1.2	33.851	-14.34	36.764	337.	1.6805	-11.908	-.28935

CURRENT rms
Frequency = 1.2 MHz
Input power = 9.20283 watts
Efficiency = 100. %
coordinates in degrees

current no.	X	Y	Z	mag (amps)	phase (deg)	real (amps)	imaginary (amps)
GND	0	0	0	1.44E-03	184.2	-1.44E-03	-1.05E-04
2	0	0	8.8	.0149108	184.1	-.0148721	-1.07E-03

J1	0	0	17.6	.0197296	184.	-.0196812	-1.38E-03
2J1	0	0	17.6	.0197296	184.	-.0196812	-1.38E-03
4	0	0	26.37	.0220472	183.9	-.0219962	-1.5E-03
J2	0	0	35.14	.0229556	183.7	-.0229067	-1.5E-03
2J1	0	0	35.14	.0229556	183.7	-.0229067	-1.5E-03
6	0	0	39.52	.0228414	183.7	-.0227947	-1.46E-03
J3	0	0	43.9	.0224198	183.6	-.0223761	-1.4E-03
2J1	0	0	43.9	.0224198	183.6	-.0223761	-1.4E-03
8	0	0	48.3	.0218237	183.5	-.0217829	-1.33E-03
J4	0	0	52.7	.0209332	183.4	-.020896	-1.25E-03
2J1	0	0	52.7	.0209332	183.4	-.020896	-1.25E-03
10	0	0	62.575	.0180369	183.2	-.0180084	-1.01E-03
11	0	0	72.45	.0137482	183.	-.0137293	-7.19E-04
12	0	0	82.325	8.07E-03	182.7	-8.06E-03	-3.86E-04
END	0	0	92.2	0	0	0	0
GND	-78.2854	-41.2752	0	1.55E-03	187.8	-1.54E-03	-2.1E-04
14	-78.2854	-41.2752	8.8	.0157455	187.7	-.0156039	-2.11E-03
J6	-78.2854	-41.2752	17.6	.0207695	187.6	-.0205894	-2.73E-03
2J1	-78.2854	-41.2752	17.6	.0207695	187.6	-.0205894	-2.73E-03
16	-78.2854	-41.2752	26.37	.0231444	187.4	-.0229507	-2.99E-03
J7	-78.2854	-41.2752	35.14	.024006	187.2	-.0238144	-3.03E-03
2J1	-78.2854	-41.2752	35.14	.024006	187.2	-.0238144	-3.03E-03
18	-78.2854	-41.2752	39.52	.0238428	187.2	-.0236564	-2.98E-03
J8	-78.2854	-41.2752	43.9	.0233477	187.1	-.0231697	-2.88E-03
2J1	-78.2854	-41.2752	43.9	.0233477	187.1	-.0231697	-2.88E-03
20	-78.2854	-41.2752	48.3	.0226769	187.	-.0225076	-2.77E-03
J9	-78.2854	-41.2752	52.7	.0216889	186.9	-.0215309	-2.61E-03
2J1	-78.2854	-41.2752	52.7	.0216889	186.9	-.0215309	-2.61E-03
22	-78.2854	-41.2752	62.275	.0186453	186.7	-.0185162	-2.19E-03
23	-78.2854	-41.2752	71.85	.0141998	186.6	-.014107	-1.62E-03
24	-78.2854	-41.2752	81.425	8.34E-03	186.3	-8.29E-03	-9.22E-04
END	-78.2854	-41.2752	91.	0	0	0	0
GND	-73.2367	101.545	0	2.58E-03	313.5	1.78E-03	-1.87E-03
26	-73.2367	101.545	8.8	.0266673	313.6	.0183745	-.0193266
J11	-73.2367	101.545	17.6	.03513	313.6	.0242355	-.0254314
2J1	-73.2367	101.545	17.6	.03513	313.6	.0242355	-.0254314
28	-73.2367	101.545	26.37	.0390809	313.7	.0269943	-.02826
J12	-73.2367	101.545	35.14	.040443	313.8	.0279823	-.0291998
2J1	-73.2367	101.545	35.14	.040443	313.8	.0279823	-.0291998
30	-73.2367	101.545	39.52	.0401301	313.8	.0277812	-.0289591
J13	-73.2367	101.545	43.9	.0392577	313.8	.0271963	-.0283113
2J1	-73.2367	101.545	43.9	.0392577	313.8	.0271963	-.0283113
32	-73.2367	101.545	48.3	.0381042	313.9	.0264123	-.027465
J14	-73.2367	101.545	52.7	.0364271	313.9	.0252641	-.0262423
2J1	-73.2367	101.545	52.7	.0364271	313.9	.0252641	-.0262423
34	-73.2367	101.545	62.525	.0311706	314.	.0216568	-.0224185
35	-73.2367	101.545	72.35	.0235831	314.1	.0164135	-.016934
36	-73.2367	101.545	82.175	.0137347	314.2	9.57E-03	-9.85E-03
END	-73.2367	101.545	92.	0	0	0	0
GND	-158.264	159.93	0	.521402	100.8	-.0973347	.512237
38	-158.264	159.93	8.8	.500428	96.5	-.0564734	.497231
J16	-158.264	159.93	17.6	.475169	94.6	-.038422	.473613
2J1	-158.264	159.93	17.6	.475169	94.6	-.038422	.473613
40	-158.264	159.93	26.37	.446016	93.4	-.0264998	.445228
J17	-158.264	159.93	35.14	.402875	92.2	-.0157786	.402566
2J1	-158.264	159.93	35.14	.402875	92.2	-.0157786	.402566
42	-158.264	159.93	39.52	.382675	91.8	-.012248	.382479

J18	-158.264	159.93	43.9	.357681	91.4	-8.64E-03	.357576
2J1	-158.264	159.93	43.9	.357681	91.4	-8.64E-03	.357576
44	-158.264	159.93	48.3	.335872	91.	-6.11E-03	.335816
J19	-158.264	159.93	52.7	.310504	90.7	-3.72E-03	.310482
2J1	-158.264	159.93	52.7	.310504	90.7	-3.72E-03	.310482
46	-158.264	159.93	62.4	.250297	90.	5.91E-05	.250297
47	-158.264	159.93	72.1	.17991	89.3	2.11E-03	.179897
48	-158.264	159.93	81.8	.100162	88.7	2.29E-03	.100136
END	-158.264	159.93	91.5	0	0	0	0
GND	-137.915	-24.0701	0	1.5E-03	224.2	-1.08E-03	-1.05E-03
50	-137.915	-24.0701	8.8	.0155625	224.2	-.0111606	-.0108459
J21	-137.915	-24.0701	17.6	.0205241	224.1	-.0147458	-.0142759
2J1	-137.915	-24.0701	17.6	.0205241	224.1	-.0147458	-.0142759
52	-137.915	-24.0701	26.37	.0228573	224.	-.0164545	-.0158653
J22	-137.915	-24.0701	35.14	.0236842	223.8	-.017098	-.016389
2J1	-137.915	-24.0701	35.14	.0236842	223.8	-.017098	-.016389
54	-137.915	-24.0701	39.52	.023512	223.7	-.0169973	-.0162451
J23	-137.915	-24.0701	43.9	.0230102	223.6	-.0166628	-.0158688
2J1	-137.915	-24.0701	43.9	.0230102	223.6	-.0166628	-.0158688
56	-137.915	-24.0701	48.3	.0223375	223.5	-.0161996	-.0153798
J24	-137.915	-24.0701	52.7	.0213516	223.4	-.0155118	-.0146723
2J1	-137.915	-24.0701	52.7	.0213516	223.4	-.0155118	-.0146723
58	-137.915	-24.0701	62.275	.0183287	223.2	-.0133675	-.01254
59	-137.915	-24.0701	71.85	.0139355	222.9	-.01021	-9.48E-03
60	-137.915	-24.0701	81.425	8.17E-03	222.6	-6.02E-03	-5.53E-03
END	-137.915	-24.0701	91.	0	0	0	0
GND	-213.087	156.528	0	3.53E-03	348.5	3.46E-03	-7.02E-04
62	-213.087	156.528	8.8	.03646	348.8	.0357642	-7.09E-03
J26	-213.087	156.528	17.6	.047909	349.3	.0470781	-8.88E-03
2J1	-213.087	156.528	17.6	.047909	349.3	.0470781	-8.88E-03
64	-213.087	156.528	26.37	.0531838	349.8	.052351	-9.37E-03
J27	-213.087	156.528	35.14	.0549186	350.6	.0541777	-8.99E-03
2J1	-213.087	156.528	35.14	.0549186	350.6	.0541777	-8.99E-03
66	-213.087	156.528	39.52	.0544508	350.9	.0537637	-8.62E-03
J28	-213.087	156.528	43.9	.0532263	351.3	.0526088	-8.08E-03
2J1	-213.087	156.528	43.9	.0532263	351.3	.0526088	-8.08E-03
68	-213.087	156.528	48.3	.051636	351.6	.0510797	-7.56E-03
J29	-213.087	156.528	52.7	.0493398	351.9	.0488524	-6.92E-03
2J1	-213.087	156.528	52.7	.0493398	351.9	.0488524	-6.92E-03
70	-213.087	156.528	62.525	.042206	352.8	.0418742	-5.28E-03
71	-213.087	156.528	72.35	.0319431	353.8	.0317539	-3.47E-03
72	-213.087	156.528	82.175	.0186236	354.8	.018546	-1.7E-03
END	-213.087	156.528	92.	0	0	0	0

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

wire	caps	Radius	Angle	Z	radius	segs
1	none	0	0	0	1.5039	2
		0	0	17.6		
2	none	0	0	17.6	1.0188	2
		0	0	35.14		
3	none	0	0	35.14	.6986	2
		0	0	43.9		
4	none	0	0	43.9	.4656	2
		0	0	52.7		
5	none	0	0	52.7	.395	4
		0	0	92.2		
6	none	88.5	207.8	0	1.5039	2
		88.5	207.8	17.6		
7	none	88.5	207.8	17.6	1.0188	2
		88.5	207.8	35.14		
8	none	88.5	207.8	35.14	.6986	2
		88.5	207.8	43.9		
9	none	88.5	207.8	43.9	.4656	2
		88.5	207.8	52.7		
10	none	88.5	207.8	52.7	.395	4
		88.5	207.8	91.		
11	none	125.2	125.8	0	1.5039	2
		125.2	125.8	17.6		
12	none	125.2	125.8	17.6	1.0188	2
		125.2	125.8	35.14		
13	none	125.2	125.8	35.14	.6986	2
		125.2	125.8	43.9		
14	none	125.2	125.8	43.9	.4656	2
		125.2	125.8	52.7		
15	none	125.2	125.8	52.7	.395	4
		125.2	125.8	92.		
16	none	225.	134.7	0	1.5039	2
		225.	134.7	17.6		
17	none	225.	134.7	17.6	1.0188	2
		225.	134.7	35.14		
18	none	225.	134.7	35.14	.6989	2
		225.	134.7	43.9		
19	none	225.	134.7	43.9	.4656	2
		225.	134.7	52.7		
20	none	225.	134.7	52.7	.395	4
		225.	134.7	91.5		
21	none	140.	189.9	0	1.5039	2
		140.	189.9	17.6		
22	none	140.	189.9	17.6	1.0188	2
		140.	189.9	35.14		
23	none	140.	189.9	35.14	.6986	2
		140.	189.9	43.9		
24	none	140.	189.9	43.9	.4656	2
		140.	189.9	52.7		
25	none	140.	189.9	52.7	.395	4
		140.	189.9	91.		
26	none	264.4	143.7	0	1.5039	2

```
           264.4        143.7        17.6
 27   none 264.4        143.7        17.6         1.0188       2
           264.4        143.7        35.14
 28   none 264.4        143.7        35.14        .6989        2
           264.4        143.7        43.9
 29   none 264.4        143.7        43.9         .4656        2
           264.4        143.7        52.7
 30   none 264.4        143.7        52.7         .395         4
           264.4        143.7        92.

Number of wires          =  30
          current nodes  =  72

                         minimum                  maximum
Individual wires      wire    value             wire  value
segment length         3      4.38               5    9.875
radius                 5      .395               1    1.5039


ELECTRICAL DESCRIPTION
Frequencies (MHz)
     frequency                 no. of  segment length (wavelengths)
 no. lowest       step          steps   minimum        maximum
 1   1.2          0              1      .0121667       .0274306

Sources
source node    sector  magnitude      phase          type
 1      49      1      27.1085        77.8           voltage

Lumped loads
             resistance    reactance     inductance  capacitance passive
load  node   (ohms)        (ohms)        (mH)        (uF)        circuit
 1     1     0             -4,420.97     0           0            0
 2     13    0             -4,320.97     0           0            0
 3     25    0             -4,420.97     0           0            0
 4     37    0             -4,420.97     0           0            0
 5     49    0             0             0           0            0
 6     61    0             -4,420.97     0           0            0

IMPEDANCE
   normalization = 50.
freq     resist   react    imped    phase    VSWR    S11      S12
(MHz)    (ohms)   (ohms)   (ohms)   (deg)            dB       dB
source =  1; node 49, sector 1
1.2      35.252   -12.265  37.325   340.8    1.573   -13.045  -.22092


CURRENT rms
Frequency   = 1.2 MHz
Input power = 9.29768 watts
Efficiency  = 100. %
coordinates in degrees
current                                  mag      phase  real      imaginary
no.    X         Y         Z            (amps)   (deg)  (amps)    (amps)
GND    0         0         0            2.36E-03 268.6  -5.92E-05 -2.36E-03
 2     0         0         8.8          .0244537 268.5  -6.28E-04 -.0244457
J1     0         0         17.6         .0322843 268.5  -8.71E-04 -.0322726
```

2J1	0	0	17.6	.0322843	268.5	-8.71E-04	-.0322726
4	0	0	26.37	.035995	268.4	-1.02E-03	-.0359806
J2	0	0	35.14	.0373631	268.3	-1.12E-03	-.0373463
2J1	0	0	35.14	.0373631	268.3	-1.12E-03	-.0373463
6	0	0	39.52	.0371257	268.2	-1.14E-03	-.0371081
J3	0	0	43.9	.0363802	268.2	-1.16E-03	-.0363618
2J1	0	0	43.9	.0363802	268.2	-1.16E-03	-.0363618
8	0	0	48.3	.035363	268.1	-1.15E-03	-.0353442
J4	0	0	52.7	.0338654	268.1	-1.14E-03	-.0338463
2J1	0	0	52.7	.0338654	268.1	-1.14E-03	-.0338463
10	0	0	62.575	.0290719	268.	-1.03E-03	-.0290537
11	0	0	72.45	.0220672	267.9	-8.28E-04	-.0220517
12	0	0	82.325	.0128933	267.7	-5.15E-04	-.0128831
END	0	0	92.2	0	0	0	0
GND	-78.2854	-41.2752	0	3.25E-03	342.2	3.1E-03	-9.97E-04
14	-78.2854	-41.2752	8.8	.0329003	342.4	.0313549	-9.96E-03
J6	-78.2854	-41.2752	17.6	.0431723	342.8	.0412443	-.0127574
2J1	-78.2854	-41.2752	17.6	.0431723	342.8	.0412443	-.0127574
16	-78.2854	-41.2752	26.37	.0478617	343.3	.0458339	-.0137839
J7	-78.2854	-41.2752	35.14	.0493107	343.9	.0473712	-.0136934
2J1	-78.2854	-41.2752	35.14	.0493107	343.9	.0473712	-.0136934
18	-78.2854	-41.2752	39.52	.0488295	344.1	.0469696	-.013348
J8	-78.2854	-41.2752	43.9	.0476487	344.4	.0459045	-.012774
2J1	-78.2854	-41.2752	43.9	.0476487	344.4	.0459045	-.012774
20	-78.2854	-41.2752	48.3	.0461454	344.7	.0445128	-.0121658
J9	-78.2854	-41.2752	52.7	.0439895	345.	.0424925	-.0113781
2J1	-78.2854	-41.2752	52.7	.0439895	345.	.0424925	-.0113781
22	-78.2854	-41.2752	62.275	.037555	345.7	.0363925	-9.27E-03
23	-78.2854	-41.2752	71.85	.0283898	346.5	.0276005	-6.65E-03
24	-78.2854	-41.2752	81.425	.0165487	347.2	.0161406	-3.65E-03
END	-78.2854	-41.2752	91.	0	0	0	0
GND	-73.2367	101.545	0	1.78E-03	268.6	-4.48E-05	-1.78E-03
26	-73.2367	101.545	8.8	.0184125	268.5	-4.76E-04	-.0184063
J11	-73.2367	101.545	17.6	.0242902	268.4	-6.63E-04	-.0242811
2J1	-73.2367	101.545	17.6	.0242902	268.4	-6.63E-04	-.0242811
28	-73.2367	101.545	26.37	.0270606	268.4	-7.79E-04	-.0270494
J12	-73.2367	101.545	35.14	.028057	268.2	-8.64E-04	-.0280437
2J1	-73.2367	101.545	35.14	.028057	268.2	-8.64E-04	-.0280437
30	-73.2367	101.545	39.52	.027864	268.2	-8.86E-04	-.0278499
J13	-73.2367	101.545	43.9	.0272862	268.1	-9.01E-04	-.0272713
2J1	-73.2367	101.545	43.9	.0272862	268.1	-9.01E-04	-.0272713
32	-73.2367	101.545	48.3	.0265071	268.	-9.03E-04	-.0264918
J14	-73.2367	101.545	52.7	.0253654	268.	-8.95E-04	-.0253496
2J1	-73.2367	101.545	52.7	.0253654	268.	-8.95E-04	-.0253496
34	-73.2367	101.545	62.525	.0217513	267.8	-8.23E-04	-.0217358
35	-73.2367	101.545	72.35	.0164949	267.7	-6.73E-04	-.0164812
36	-73.2367	101.545	82.175	9.63E-03	267.5	-4.26E-04	-9.62E-03
END	-73.2367	101.545	92.	0	0	0	0
GND	-158.264	159.93	0	1.48E-03	220.5	-1.13E-03	-9.62E-04
38	-158.264	159.93	8.8	.0153211	220.4	-.0116646	-9.93E-03
J16	-158.264	159.93	17.6	.0202069	220.3	-.0154108	-.0130701
2J1	-158.264	159.93	17.6	.0202069	220.3	-.0154108	-.0130701
40	-158.264	159.93	26.37	.0225111	220.2	-.0171982	-.0145249
J17	-158.264	159.93	35.14	.0233464	220.	-.0178791	-.015013
2J1	-158.264	159.93	35.14	.0233464	220.	-.0178791	-.015013
42	-158.264	159.93	39.52	.02319	219.9	-.0177796	-.0148883
J18	-158.264	159.93	43.9	.0227143	219.8	-.0174386	-.0145546

2J1	-158.264	159.93	43.9	.0227143	219.8	-.0174386	-.0145546
44	-158.264	159.93	48.3	.02207	219.8	-.0169636	-.0141181
J19	-158.264	159.93	52.7	.021122	219.7	-.0162571	-.0134851
2J1	-158.264	159.93	52.7	.021122	219.7	-.0162571	-.0134851
46	-158.264	159.93	62.4	.0181557	219.5	-.0140151	-.0115415
47	-158.264	159.93	72.1	.0138192	219.2	-.0107037	-8.74E-03
48	-158.264	159.93	81.8	8.11E-03	219.	-6.3E-03	-5.1E-03
END	-158.264	159.93	91.5	0	0	0	0
GND	-137.915	-24.0701	0	.513565	97.	-.0624402	.509755
50	-137.915	-24.0701	8.8	.495207	92.5	-.0220074	.494717
J21	-137.915	-24.0701	17.6	.471023	90.6	-5.33E-03	.470993
2J1	-137.915	-24.0701	17.6	.471023	90.6	-5.33E-03	.470993
52	-137.915	-24.0701	26.37	.442505	89.4	4.78E-03	.442479
J22	-137.915	-24.0701	35.14	.399825	88.2	.0126316	.399626
2J1	-137.915	-24.0701	35.14	.399825	88.2	.0126316	.399626
54	-137.915	-24.0701	39.52	.379742	87.8	.0147819	.379454
J23	-137.915	-24.0701	43.9	.354841	87.3	.0166611	.354449
2J1	-137.915	-24.0701	43.9	.354841	87.3	.0166611	.354449
56	-137.915	-24.0701	48.3	.333066	87.	.0176628	.332598
J24	-137.915	-24.0701	52.7	.307697	86.6	.0182715	.307154
2J1	-137.915	-24.0701	52.7	.307697	86.6	.0182715	.307154
58	-137.915	-24.0701	62.275	.248221	85.9	.0177721	.247584
59	-137.915	-24.0701	71.85	.178597	85.2	.0148343	.17798
60	-137.915	-24.0701	81.425	.0995743	84.6	9.37E-03	.0991328
END	-137.915	-24.0701	91.	0	0	0	0
GND	-213.087	156.528	0	1.44E-03	214.4	-1.19E-03	-8.16E-04
62	-213.087	156.528	8.8	.0149198	214.4	-.0123147	-8.42E-03
J26	-213.087	156.528	17.6	.0196957	214.2	-.0162821	-.0110821
2J1	-213.087	156.528	17.6	.0196957	214.2	-.0162821	-.0110821
64	-213.087	156.528	26.37	.0219639	214.1	-.0181855	-.0123166
J27	-213.087	156.528	35.14	.0228148	213.9	-.018929	-.0127361
2J1	-213.087	156.528	35.14	.0228148	213.9	-.018929	-.0127361
66	-213.087	156.528	39.52	.0226802	213.9	-.0188352	-.0126344
J28	-213.087	156.528	43.9	.0222385	213.8	-.018489	-.0123574
2J1	-213.087	156.528	43.9	.0222385	213.8	-.018489	-.0123574
68	-213.087	156.528	48.3	.0216293	213.7	-.0179995	-.0119935
J29	-213.087	156.528	52.7	.0207278	213.6	-.0172681	-.0114652
2J1	-213.087	156.528	52.7	.0207278	213.6	-.0172681	-.0114652
70	-213.087	156.528	62.525	.0178407	213.4	-.014898	-9.82E-03
71	-213.087	156.528	72.35	.0135915	213.1	-.0113798	-7.43E-03
72	-213.087	156.528	82.175	7.98E-03	212.9	-6.7E-03	-4.33E-03
END	-213.087	156.528	92.	0	0	0	0

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

wire	caps	Radius	Angle	Z	radius	segs
1	none	0	0	0	1.5039	2
		0	0	17.6		
2	none	0	0	17.6	1.0188	2
		0	0	35.14		
3	none	0	0	35.14	.6986	2
		0	0	43.9		
4	none	0	0	43.9	.4656	2
		0	0	52.7		
5	none	0	0	52.7	.395	4
		0	0	92.2		
6	none	88.5	207.8	0	1.5039	2
		88.5	207.8	17.6		
7	none	88.5	207.8	17.6	1.0188	2
		88.5	207.8	35.14		
8	none	88.5	207.8	35.14	.6986	2
		88.5	207.8	43.9		
9	none	88.5	207.8	43.9	.4656	2
		88.5	207.8	52.7		
10	none	88.5	207.8	52.7	.395	4
		88.5	207.8	91.		
11	none	125.2	125.8	0	1.5039	2
		125.2	125.8	17.6		
12	none	125.2	125.8	17.6	1.0188	2
		125.2	125.8	35.14		
13	none	125.2	125.8	35.14	.6986	2
		125.2	125.8	43.9		
14	none	125.2	125.8	43.9	.4656	2
		125.2	125.8	52.7		
15	none	125.2	125.8	52.7	.395	4
		125.2	125.8	92.		
16	none	225.	134.7	0	1.5039	2
		225.	134.7	17.6		
17	none	225.	134.7	17.6	1.0188	2
		225.	134.7	35.14		
18	none	225.	134.7	35.14	.6986	2
		225.	134.7	43.9		
19	none	225.	134.7	43.9	.4656	2
		225.	134.7	52.7		
20	none	225.	134.7	52.7	.395	4
		225.	134.7	91.5		
21	none	140.	189.9	0	1.5039	2
		140.	189.9	17.6		
22	none	140.	189.9	17.6	1.0188	2
		140.	189.9	35.14		
23	none	140.	189.9	35.14	.6986	2
		140.	189.9	43.9		
24	none	140.	189.9	43.9	.4656	2
		140.	189.9	52.7		
25	none	140.	189.9	52.7	.395	4
		140.	189.9	91.		
26	none	264.4	143.7	0	1.5039	2

		264.4	143.7	17.6		
27	none	264.4	143.7	17.6	1.0188	2
		264.4	143.7	35.14		
28	none	264.4	143.7	35.14	.6986	2
		264.4	143.7	43.9		
29	none	264.4	143.7	43.9	.4656	2
		264.4	143.7	52.7		
30	none	264.4	143.7	52.7	.395	4
		264.4	143.7	92.		

Number of wires = 30
current nodes = 72

	minimum		maximum	
Individual wires	wire	value	wire	value
segment length	3	4.38	5	9.875
radius	5	.395	1	1.5039

ELECTRICAL DESCRIPTION
Frequencies (MHz)

	frequency		no. of	segment length (wavelengths)	
no.	lowest	step	steps	minimum	maximum
1	1.2	0	1	.0121667	.0274306

Sources

source	node	sector	magnitude	phase	type
1	61	1	27.1085	77.8	voltage

Lumped loads

load	node	resistance (ohms)	reactance (ohms)	inductance (mH)	capacitance (uF)	passive circuit
1	1	0	-4,420.97	0	0	0
2	13	0	-4,420.97	0	0	0
3	25	0	-4,420.97	0	0	0
4	37	0	-4,420.97	0	0	0
5	49	0	-4,420.97	0	0	0
6	61	0	0	0	0	0

IMPEDANCE
normalization = 50.

freq (MHz)	resist (ohms)	react (ohms)	imped (ohms)	phase (deg)	VSWR	S11 dB	S12 dB
source = 1; node 61, sector 1							
1.2	35.624	-11.643	37.478	341.9	1.5448	-13.388	-.20377

CURRENT rms
Frequency = 1.2 MHz
Input power = 9.31891 watts
Efficiency = 100. %
coordinates in degrees

current no.	X	Y	Z	mag (amps)	phase (deg)	real (amps)	imaginary (amps)
GND	0	0	0	1.52E-03	137.9	-1.13E-03	1.02E-03
2	0	0	8.8	.0157524	137.8	-.011677	.0105729

J1	0	0	17.6	.0208533	137.7	-.0154357	.0140213
2J1	0	0	17.6	.0208533	137.7	-.0154357	.0140213
4	0	0	26.37	.0233141	137.7	-.0172319	.0157038
J2	0	0	35.14	.0242906	137.5	-.0179182	.0164004
2J1	0	0	35.14	.0242906	137.5	-.0179182	.0164004
6	0	0	39.52	.0241765	137.5	-.0178175	.0163414
J3	0	0	43.9	.0237383	137.4	-.0174752	.0160662
2J1	0	0	43.9	.0237383	137.4	-.0174752	.0160662
8	0	0	48.3	.0231136	137.3	-.0169993	.0156608
J4	0	0	52.7	.0221776	137.3	-.0162931	.015046
2J1	0	0	52.7	.0221776	137.3	-.0162931	.015046
10	0	0	62.575	.0191239	137.1	-.0140155	.0130111
11	0	0	72.45	.0145893	137.	-.010662	9.96E-03
12	0	0	82.325	8.57E-03	136.8	-6.24E-03	5.87E-03
END	0	0	92.2	0	0	0	0
GND	-78.2854	-41.2752	0	1.46E-03	161.7	-1.39E-03	4.59E-04
14	-78.2854	-41.2752	8.8	.0151042	161.6	-.0143313	4.77E-03
J6	-78.2854	-41.2752	17.6	.0199463	161.5	-.0189104	6.34E-03
2J1	-78.2854	-41.2752	17.6	.0199463	161.5	-.0189104	6.34E-03
16	-78.2854	-41.2752	26.37	.0222437	161.3	-.0210723	7.12E-03
J7	-78.2854	-41.2752	35.14	.0230904	161.2	-.0218528	7.46E-03
2J1	-78.2854	-41.2752	35.14	.0230904	161.2	-.0218528	7.46E-03
18	-78.2854	-41.2752	39.52	.0229405	161.1	-.0217014	7.44E-03
J8	-78.2854	-41.2752	43.9	.022472	161.	-.0212475	7.32E-03
2J1	-78.2854	-41.2752	43.9	.022472	161.	-.0212475	7.32E-03
20	-78.2854	-41.2752	48.3	.0218326	160.9	-.0206342	7.13E-03
J9	-78.2854	-41.2752	52.7	.0208878	160.8	-.0197319	6.85E-03
2J1	-78.2854	-41.2752	52.7	.0208878	160.8	-.0197319	6.85E-03
22	-78.2854	-41.2752	62.275	.0179678	160.7	-.0169569	5.94E-03
23	-78.2854	-41.2752	71.85	.0136927	160.5	-.0129083	4.57E-03
24	-78.2854	-41.2752	81.425	8.05E-03	160.3	-7.58E-03	2.71E-03
END	-78.2854	-41.2752	91.	0	0	0	0
GND	-73.2367	101.545	0	2.27E-03	264.6	-2.14E-04	-2.26E-03
26	-73.2367	101.545	8.8	.0235	264.6	-2.23E-03	-.0233944
J11	-73.2367	101.545	17.6	.031022	264.5	-2.98E-03	-.0308783
2J1	-73.2367	101.545	17.6	.031022	264.5	-2.98E-03	-.0308783
28	-73.2367	101.545	26.37	.0345827	264.4	-3.38E-03	-.0344176
J12	-73.2367	101.545	35.14	.0358866	264.3	-3.57E-03	-.0357084
2J1	-73.2367	101.545	35.14	.0358866	264.3	-3.57E-03	-.0357084
30	-73.2367	101.545	39.52	.0356525	264.2	-3.58E-03	-.0354719
J13	-73.2367	101.545	43.9	.0349277	264.2	-3.55E-03	-.0347469
2J1	-73.2367	101.545	43.9	.0349277	264.2	-3.55E-03	-.0347469
32	-73.2367	101.545	48.3	.0339423	264.1	-3.48E-03	-.0337632
J14	-73.2367	101.545	52.7	.0324928	264.	-3.37E-03	-.0323174
2J1	-73.2367	101.545	52.7	.0324928	264.	-3.37E-03	-.0323174
34	-73.2367	101.545	62.525	.0278874	263.9	-2.96E-03	-.0277301
35	-73.2367	101.545	72.35	.0211673	263.8	-2.3E-03	-.0210417
36	-73.2367	101.545	82.175	.0123697	263.6	-1.38E-03	-.0122921
END	-73.2367	101.545	92.	0	0	0	0
GND	-158.264	159.93	0	3.46E-03	343.7	3.32E-03	-9.71E-04
38	-158.264	159.93	8.8	.0357321	343.9	.0343385	-9.88E-03
J16	-158.264	159.93	17.6	.0469159	344.4	.0451981	-.0125794
2J1	-158.264	159.93	17.6	.0469159	344.4	.0451981	-.0125794
40	-158.264	159.93	26.37	.0520364	345.	.0502536	-.0135042
J17	-158.264	159.93	35.14	.0536607	345.7	.0519895	-.0132875
2J1	-158.264	159.93	35.14	.0536607	345.7	.0519895	-.0132875
42	-158.264	159.93	39.52	.0531662	346.	.0515786	-.0128958

J18	-158.264	159.93	43.9	.0519218	346.3	.0504504	-.012273
2J1	-158.264	159.93	43.9	.0519218	346.3	.0504504	-.012273
44	-158.264	159.93	48.3	.050325	346.6	.0489623	-.0116318
J19	-158.264	159.93	52.7	.0480292	347.	.0467953	-.010817
2J1	-158.264	159.93	52.7	.0480292	347.	.0467953	-.010817
46	-158.264	159.93	62.4	.0410435	347.8	.04012	-8.66E-03
47	-158.264	159.93	72.1	.031047	348.7	.0304496	-6.06E-03
48	-158.264	159.93	81.8	.0181018	349.7	.0178115	-3.23E-03
END	-158.264	159.93	91.5	0	0	0	0
GND	-137.915	-24.0701	0	1.44E-03	213.4	-1.2E-03	-7.9E-04
50	-137.915	-24.0701	8.8	.0148561	213.3	-.0124152	-8.16E-03
J21	-137.915	-24.0701	17.6	.0196003	213.2	-.0163998	-.010734
2J1	-137.915	-24.0701	17.6	.0196003	213.2	-.0163998	-.010734
52	-137.915	-24.0701	26.37	.0218366	213.1	-.0182951	-.0119217
J22	-137.915	-24.0701	35.14	.0226367	212.9	-.0190024	-.0123017
2J1	-137.915	-24.0701	35.14	.0226367	212.9	-.0190024	-.0123017
54	-137.915	-24.0701	39.52	.0224762	212.8	-.0188859	-.0121862
J23	-137.915	-24.0701	43.9	.0220011	212.7	-.0185086	-.0118945
2J1	-137.915	-24.0701	43.9	.0220011	212.7	-.0185086	-.0118945
56	-137.915	-24.0701	48.3	.0213615	212.6	-.0179892	-.0115196
J24	-137.915	-24.0701	52.7	.0204223	212.5	-.0172197	-.0109796
2J1	-137.915	-24.0701	52.7	.0204223	212.5	-.0172197	-.0109796
58	-137.915	-24.0701	62.275	.0175368	212.3	-.014828	-9.36E-03
59	-137.915	-24.0701	71.85	.0133378	212.	-.0113151	-7.06E-03
60	-137.915	-24.0701	81.425	7.82E-03	211.6	-6.66E-03	-4.1E-03
END	-137.915	-24.0701	91.	0	0	0	0
GND	-213.087	156.528	0	.511463	95.9	-.0525709	.508754
62	-213.087	156.528	8.8	.49401	91.4	-.0122629	.493858
J26	-213.087	156.528	17.6	.470605	89.5	4.02E-03	.470588
2J1	-213.087	156.528	17.6	.470605	89.5	4.02E-03	.470588
64	-213.087	156.528	26.37	.44286	88.2	.0136272	.44265
J27	-213.087	156.528	35.14	.401205	87.	.020723	.400669
2J1	-213.087	156.528	35.14	.401205	87.	.020723	.400669
66	-213.087	156.528	39.52	.381571	86.6	.0225163	.380906
J28	-213.087	156.528	43.9	.357206	86.2	.0239547	.356402
2J1	-213.087	156.528	43.9	.357206	86.2	.0239547	.356402
68	-213.087	156.528	48.3	.33589	85.8	.024572	.33499
J29	-213.087	156.528	52.7	.311047	85.4	.0247369	.310062
2J1	-213.087	156.528	52.7	.311047	85.4	.0247369	.310062
70	-213.087	156.528	62.525	.251056	84.7	.0231264	.249988
71	-213.087	156.528	72.35	.180618	84.	.0187719	.17964
72	-213.087	156.528	82.175	.100595	83.4	.0115963	.0999248
END	-213.087	156.528	92.	0	0	0	0

WLXX-AM License Corp
WRTO (AM) 1200 kHz
20 kW DA-D 4.5 kW DA-N
Facility ID 11196
Chicago, Illinois

Amendment
Self Impedance Base Corrections

Tower 1

branch	label	nodes		value	function	tolerance	condition
1	V1	0	0	1.			
2	R1	1	0	100.K			
3	R2	1	2	0.1			
4	C1	2	0	8.p			
5	L1	2	3	3.5u			
6	C2	3	0	30.p			
7	R3	3	0	34.223	J-6.3		

-->ac 1.2m

freq	probe	value	dB	phase	phase delay
1.2M	V:1	395.896u	-68.048	29.966	-69.365n
1.2M	V:2	395.03u	-68.067	30.038	-69.5327n
1.2M	V:3	347.771u	-69.174	-11.003	25.4697n
1.2M	Z:R1	39.5896	15.976	29.966	-69.365n
1.2M	I:R2	9.99657u	-100.003	-0.011	26.2354p
1.2M	I:R3	9.99398u	-100.005	-0.572	1.32476n

ZATU = ZR1 = 34.3 +j19.77

Tower 2

branch	label	nodes		value	function	tolerance	condition
1	V1	0	0	1.			
2	R1	1	0	100.K			
3	R2	1	2	0.1			
4	C1	2	0	8.p			
5	L1	2	3	3.u			
6	C2	3	0	30.p			
7	R3	3	0	31.667	J-14.623		

-->ac 1.2m

freq	probe	value	dB	phase	phase delay
1.2M	V:1	325.165u	-69.758	13.805	-31.9564n
1.2M	V:2	324.194u	-69.784	13.847	-32.054n

1.2M	V:3	347.697u	-69.176	-25.309	58.5846n
1.2M	Z:R1	32.5165	15.121	13.805	-31.9564n
1.2M	I:R2	9.99684u	-100.003	-0.004	10.2941p
1.2M	I:R3	9.96832u	-100.028	-0.522	1.20893n

ZATU = ZR1 = 31.577 +j7.759

Tower 3

branch	label	nodes		value	function	tolerance	condition
1	V1	0	0	1.			
2	R1	1	0	100.K			
3	R2	1	2	0.1			
4	C1	2	0	8.p			
5	L1	2	3	1.99u			
6	C2	3	0	30.p			
7	R3	3	0	35.258	J-3.2727		

-->ac 1.2m

freq	probe	value	dB	phase	phase delay
1.2M	V:1	371.275u	-68.606	17.846	-41.3113n
1.2M	V:2	370.324u	-68.628	17.894	-41.4211n
1.2M	V:3	353.941u	-69.021	-5.888	13.6295n
1.2M	Z:R1	37.1275	15.697	17.846	-41.3113n
1.2M	I:R2	9.99647u	-100.003	-0.007	15.0964p
1.2M	I:R3	9.99564u	-100.004	-0.585	1.35385n

ZATU=ZR1= 35.3 +j11.38

Tower 4

branch	label	nodes		value	function	tolerance	condition
1	V1	0	0	1.			
2	R1	1	0	100.K			
3	R2	1	2	0.1			
4	C1	2	0	8.p			
5	L1	2	3	3.u			
6	C2	3	0	30.p			
7	R3	3	0	33.851	J-14.34		

-->ac 1.2m

freq	probe	value	dB	phase	phase delay
1.2M	V:1	346.874u	-69.197	13.333	-30.8638n
1.2M	V:2	345.901u	-69.221	13.371	-30.9523n
1.2M	V:3	366.486u	-68.719	-23.517	54.4368n
1.2M	Z:R1	34.6874	15.402	13.333	-30.8638n
1.2M	I:R2	9.99662u	-100.003	-0.005	10.6131p
1.2M	I:R3	9.96885u	-100.027	-0.558	1.29201n

ZATU = ZR1 = 33.752 +j7.99

Tower 5

branch	label	nodes		value	function	tolerance	condition
1	V1	0	0	1.			
2	R1	1	0	100.K			
3	R2	1	2	0.1			
4	C1	2	0	8.p			
5	L1	2	3	3.1u			
6	C2	3	0	30.p			
7	R3	3	0	35.252	J-12.265		

-->ac 1.2m

freq	probe	value	dB	phase	phase delay
1.2M	V:1	368.064u	-68.682	17.045	-39.4564n
1.2M	V:2	367.108u	-68.704	17.091	-39.5623n
1.2M	V:3	372.315u	-68.582	-19.767	45.7569n
1.2M	Z:R1	36.8064	15.659	17.045	-39.4564n
1.2M	I:R2	9.99648u	-100.003	-0.006	14.3142p
1.2M	I:R3	9.97502u	-100.022	-0.583	1.34955n

ZATU = ZR1 = 35.19 +j10.79

Tower 6

branch	label	nodes		value	function	tolerance	condition
1	V1	0	0	1.			
2	R1	1	0	100.K			
3	R2	1	2	0.1			
4	C1	2	0	8.p			
5	L1	2	3	3.61u			
6	C2	3	0	30.p			
7	R3	3	0	35.624	J-11.643		

-->ac 1.2m

freq	probe	value	dB	phase	phase delay
1.2M	V:1	387.191u	-68.241	23.193	-53.6882n
1.2M	V:2	386.273u	-68.262	23.252	-53.8234n
1.2M	V:3	373.999u	-68.543	-18.691	43.2656n
1.2M	Z:R1	38.7191	15.879	23.193	-53.6882n
1.2M	I:R2	9.99644u	-100.003	-0.009	20.2317p
1.2M	I:R3	9.97906u	-100.018	-0.592	1.36986n

ZATU = ZR1= 35.59 +j15.248

WRTO Day
MEDIUM WAVE ARRAY SYNTHESIS FROM FIELD RATIOS

Frequency = 1.2 MHz

tower	field ratio magnitude	phase (deg)
1	1.	0
2	.45	142.2
3	1.507	63.3
4	.928	141.7
5	0	0
6	0	0

VOLTAGES AND CURRENTS - rms

source node	voltage magnitude	phase (deg)	current magnitude	phase (deg)
1	850.38	3.6	10.6281	17.
13	566.741	349.2	5.9327	124.4
25	774.425	54.9	16.277	73.2
37	326.761	82.8	10.7024	145.1
49	8.4881	70.	1.52517	74.1
61	117.65	98.9	.415036	197.8

Sum of square of source currents = 1,060.27
Total power = 20,000. watts

TOWER ADMITTANCE MATRIX

admittance	real (mhos)	imaginary (mhos)
Y(1, 1)	.0270506	-.0131836
Y(1, 2)	-.0161311	.0126932
Y(1, 3)	-.00162726	.0118405
Y(1, 4)	.000467293	-.00746484
Y(1, 5)	3.9922E-05	-.00172043
Y(1, 6)	-2.2266E-05	.000849623
Y(2, 1)	-.0161328	.0126926
Y(2, 2)	.030502	-.00472231
Y(2, 3)	-.00380374	.00492308
Y(2, 4)	.00290221	.00235404
Y(2, 5)	.000103208	.00402791
Y(2, 6)	.000169558	-.000315303
Y(3, 1)	-.00162724	.0118403
Y(3, 2)	-.00380325	.00492322
Y(3, 3)	.0149367	-.0125934
Y(3, 4)	-.00675308	.0193762
Y(3, 5)	.000462173	.000706989
Y(3, 6)	-7.0291E-05	-.00194483
Y(4, 1)	.000468387	-.00746407
Y(4, 2)	.00290099	.0023535
Y(4, 3)	-.00675524	.0193733
Y(4, 4)	.0233417	-.0106256
Y(4, 5)	.000281677	-1.3501E-05
Y(4, 6)	.000161412	.0047761
Y(5, 1)	4.0057E-05	-.0017206
Y(5, 2)	.000103208	.00402797
Y(5, 3)	.000462102	.000707114
Y(5, 4)	.000281797	-1.3517E-05
Y(5, 5)	.000134633	-.00365827

Y(5, 6)	3.4946E-05	-2.8635E-05
Y(6, 1)	-2.2111E-05	.000845702
Y(6, 2)	.000169829	-.000313973
Y(6, 3)	-7.0873E-05	-.00193508
Y(6, 4)	.000166629	.00475844
Y(6, 5)	3.4896E-05	-2.8592E-05
Y(6, 6)	.000138787	.000412989

TOWER IMPEDANCE MATRIX

impedance	real (ohms)	imaginary (ohms)
Z(1, 1)	36.3364	-2.27588
Z(1, 2)	14.4186	-13.1275
Z(1, 3)	-2.2037	-19.7131
Z(1, 4)	-11.5153	-9.01351
Z(1, 5)	-6.04059	-17.3119
Z(1, 6)	57.5764	23.5229
Z(2, 1)	14.4165	-13.1282
Z(2, 2)	30.2635	-10.5771
Z(2, 3)	-8.39888	-20.5962
Z(2, 4)	-8.35044	-8.33531
Z(2, 5)	20.9727	-10.2367
Z(2, 6)	41.6292	43.1753
Z(3, 1)	-2.20524	-19.7118
Z(3, 2)	-8.40021	-20.5965
Z(3, 3)	42.5465	-10.4063
Z(3, 4)	23.4071	-8.77694
Z(3, 5)	-2.59952	-21.8422
Z(3, 6)	-77.5386	48.0922
Z(4, 1)	-11.5302	-9.01428
Z(4, 2)	-8.36358	-8.34235
Z(4, 3)	23.4167	-8.79261
Z(4, 4)	21.6664	4.61729
Z(4, 5)	-1.1477	-9.20843
Z(4, 6)	-85.4794	-109.841
Z(5, 1)	-6.04188	-17.3105
Z(5, 2)	20.972	-10.2365
Z(5, 3)	-2.59889	-21.8413
Z(5, 4)	-1.14418	-9.19479
Z(5, 5)	31.837	264.365
Z(5, 6)	-7.30663	58.738
Z(6, 1)	57.7591	23.6082
Z(6, 2)	41.7581	43.3227
Z(6, 3)	-77.8027	48.2103
Z(6, 4)	-85.5956	-110.373
Z(6, 5)	-7.3421	58.9211
Z(6, 6)	793.182	-676.271

WLXX-AM License Corp
WRTO (AM) 1200 kHz
20 kW DA-D 4.5 kW DA-N
Facility ID 11196
Chicago, Illinois
Amendment
Day Model

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

wire	caps	Radius	Angle	Z	radius	segs
1	none	0	0	0	1.5039	2
		0	0	17.6		
2	none	0	0	17.6	1.0188	2
		0	0	35.14		
3	none	0	0	35.14	.6986	2
		0	0	43.9		
4	none	0	0	43.9	.4656	2
		0	0	52.7		
5	none	0	0	52.7	.395	4
		0	0	92.2		
6	none	88.5	207.8	0	1.5039	2
		88.5	207.8	17.6		
7	none	88.5	207.8	17.6	1.0188	2
		88.5	207.8	35.14		
8	none	88.5	207.8	35.14	.6986	2
		88.5	207.8	43.9		
9	none	88.5	207.8	43.9	.4656	2
		88.5	207.8	52.7		
10	none	88.5	207.8	52.7	.395	4
		88.5	207.8	91.		
11	none	125.2	125.8	0	1.5039	2
		125.2	125.8	17.6		
12	none	125.2	125.8	17.6	1.0188	2
		125.2	125.8	35.14		
13	none	125.2	125.8	35.14	.6986	2
		125.2	125.8	43.9		
14	none	125.2	125.8	43.9	.4656	2
		125.2	125.8	52.7		
15	none	125.2	125.8	52.7	.395	4
		125.2	125.8	92.		
16	none	225.	134.7	0	1.5039	2
		225.	134.7	17.6		
17	none	225.	134.7	17.6	1.0188	2
		225.	134.7	35.14		
18	none	225.	134.7	35.14	.6989	2
		225.	134.7	43.9		
19	none	225.	134.7	43.9	.4656	2
		225.	134.7	52.7		
20	none	225.	134.7	52.7	.395	4
		225.	134.7	91.5		
21	none	140.	189.9	0	1.5039	2
		140.	189.9	17.6		
22	none	140.	189.9	17.6	1.0188	2
		140.	189.9	35.14		

23	none	140.	189.9	35.14	.6986	2
		140.	189.9	43.9		
24	none	140.	189.9	43.9	.4656	2
		140.	189.9	52.7		
25	none	140.	189.9	52.7	.395	4
		140.	189.9	91.		
26	none	264.4	143.7	0	1.5039	2
		264.4	143.7	17.6		
27	none	264.4	143.7	17.6	1.0188	2
		264.4	143.7	35.14		
28	none	264.4	143.7	35.14	.6989	2
		264.4	143.7	43.9		
29	none	264.4	143.7	43.9	.4656	2
		264.4	143.7	52.7		
30	none	264.4	143.7	52.7	.395	4
		264.4	143.7	92.		

Number of wires = 30
current nodes = 72

	minimum		maximum	
Individual wires	wire	value	wire	value
segment length	3	4.38	5	9.875
radius	5	.395	1	1.5039

ELECTRICAL DESCRIPTION
Frequencies (MHz)

	frequency		no. of	segment length (wavelengths)	
no.	lowest	step	steps	minimum	maximum
1	1.2	0	1	.0121667	.0274306

Sources

source	node	sector	magnitude	phase	type
1	1	1	1,202.62	3.6	voltage
2	13	1	801.512	349.2	voltage
3	25	1	1,095.2	54.8	voltage
4	37	1	461.926	82.8	voltage

Lumped loads

load	node	resistance (ohms)	reactance (ohms)	inductance (mH)	capacitance (uF)	passive circuit
1	49	0	279.	0	0	0
2	61	0	309.	0	0	0

IMPEDANCE
normalization = 50.

freq (MHz)	resist (ohms)	react (ohms)	imped (ohms)	phase (deg)	VSWR	S11 dB	S12 dB
source = 1; node 1, sector 1							
1.2	77.894	-18.604	80.085	346.6	1.7006	-11.72	-.3026
source = 2; node 13, sector 1							
1.2	-67.631	-67.838	95.791	225.1	****	****	****
source = 3; node 25, sector 1							
1.2	45.131	-15.04	47.571	341.6	1.3928	-15.696	-.11862

source = 4; node 37, sector 1
1.2 14.139 -27.154 30.615 297.5 4.6469 -3.7977 -2.344

CURRENT rms
Frequency = 1.2 MHz
Input power = 20,000. watts
Efficiency = 100. %
coordinates in degrees

current no.	X	Y	Z	mag (amps)	phase (deg)	real (amps)	imaginary (amps)
GND	0	0	0	10.6224	17.	10.1565	3.11147
2	0	0	8.8	10.223	7.2	10.1431	1.27603
J1	0	0	17.6	9.79277	3.	9.77947	.510106
2J1	0	0	17.6	9.79277	3.	9.77947	.510106
4	0	0	26.37	9.27025	.2	9.27016	.0386166
J2	0	0	35.14	8.45838	357.7	8.4516	-.338813
2J1	0	0	35.14	8.45838	357.7	8.4516	-.338813
6	0	0	39.52	8.06751	356.8	8.05511	-.447056
J3	0	0	43.9	7.57766	355.9	7.55797	-.545882
2J1	0	0	43.9	7.57766	355.9	7.55797	-.545882
8	0	0	48.3	7.14459	355.2	7.11905	-.603597
J4	0	0	52.7	6.63576	354.4	6.60423	-.646166
2J1	0	0	52.7	6.63576	354.4	6.60423	-.646166
10	0	0	62.575	5.38418	353.	5.34375	-.658637
11	0	0	72.45	3.89261	351.7	3.85142	-.564778
12	0	0	82.325	2.17785	350.4	2.14751	-.362257
END	0	0	92.2	0	0	0	0
GND	-78.2854	-41.2752	0	5.91876	124.1	-3.31934	4.90038
14	-78.2854	-41.2752	8.8	5.06615	133.7	-3.50125	3.66157
J6	-78.2854	-41.2752	17.6	4.59927	138.5	-3.4446	3.04763
2J1	-78.2854	-41.2752	17.6	4.59927	138.5	-3.4446	3.04763
16	-78.2854	-41.2752	26.37	4.19948	141.9	-3.30445	2.59158
J7	-78.2854	-41.2752	35.14	3.70311	145.2	-3.04106	2.11306
2J1	-78.2854	-41.2752	35.14	3.70311	145.2	-3.04106	2.11306
18	-78.2854	-41.2752	39.52	3.48955	146.4	-2.90659	1.93098
J8	-78.2854	-41.2752	43.9	3.23407	147.7	-2.73429	1.72709
2J1	-78.2854	-41.2752	43.9	3.23407	147.7	-2.73429	1.72709
20	-78.2854	-41.2752	48.3	3.01777	148.7	-2.57932	1.56654
J9	-78.2854	-41.2752	52.7	2.77174	149.8	-2.39521	1.39481
2J1	-78.2854	-41.2752	52.7	2.77174	149.8	-2.39521	1.39481
22	-78.2854	-41.2752	62.275	2.21247	151.8	-1.95013	1.04501
23	-78.2854	-41.2752	71.85	1.57806	153.7	-1.41502	.69857
24	-78.2854	-41.2752	81.425	.873524	155.6	-.795262	.36139
END	-78.2854	-41.2752	91.	0	0	0	0
GND	-73.2367	101.545	0	16.2854	73.2	4.6985	15.5929
26	-73.2367	101.545	8.8	15.6424	67.5	5.9803	14.4541
J11	-73.2367	101.545	17.6	14.8844	65.1	6.27418	13.4974
2J1	-73.2367	101.545	17.6	14.8844	65.1	6.27418	13.4974
28	-73.2367	101.545	26.37	14.0026	63.4	6.26242	12.5242
J12	-73.2367	101.545	35.14	12.6865	61.9	5.97508	11.1913
2J1	-73.2367	101.545	35.14	12.6865	61.9	5.97508	11.1913
30	-73.2367	101.545	39.52	12.0671	61.4	5.78292	10.5911
J13	-73.2367	101.545	43.9	11.2986	60.8	5.51577	9.86075
2J1	-73.2367	101.545	43.9	11.2986	60.8	5.51577	9.86075
32	-73.2367	101.545	48.3	10.626	60.3	5.25876	9.23352

J14	-73.2367	101.545	52.7	9.84212	59.9	4.93925	8.513
2J1	-73.2367	101.545	52.7	9.84212	59.9	4.93925	8.513
34	-73.2367	101.545	62.525	7.94813	59.	4.09593	6.81147
35	-73.2367	101.545	72.35	5.72168	58.2	3.01919	4.86026
36	-73.2367	101.545	82.175	3.18886	57.4	1.71951	2.68553
END	-73.2367	101.545	92.	0	0	0	0
GND	-158.264	159.93	0	10.6731	145.3	-8.77423	6.07679
38	-158.264	159.93	8.8	9.93156	143.4	-7.9778	5.91529
J16	-158.264	159.93	17.6	9.29125	142.6	-7.37972	5.64509
2J1	-158.264	159.93	17.6	9.29125	142.6	-7.37972	5.64509
40	-158.264	159.93	26.37	8.63139	142.	-6.79984	5.3163
J17	-158.264	159.93	35.14	7.71921	141.4	-6.03083	4.81823
2J1	-158.264	159.93	35.14	7.71921	141.4	-6.03083	4.81823
42	-158.264	159.93	39.52	7.30633	141.2	-5.69067	4.58243
J18	-158.264	159.93	43.9	6.80267	140.9	-5.27993	4.28936
2J1	-158.264	159.93	43.9	6.80267	140.9	-5.27993	4.28936
44	-158.264	159.93	48.3	6.36921	140.7	-4.93005	4.03255
J19	-158.264	159.93	52.7	5.87023	140.5	-4.53057	3.73276
2J1	-158.264	159.93	52.7	5.87023	140.5	-4.53057	3.73276
46	-158.264	159.93	62.4	4.70412	140.1	-3.6087	3.01762
47	-158.264	159.93	72.1	3.36294	139.7	-2.56436	2.17564
48	-158.264	159.93	81.8	1.86276	139.3	-1.41179	1.21521
END	-158.264	159.93	91.5	0	0	0	0
GND	-137.915	-24.0701	0	1.52778	75.3	.388102	1.47766
50	-137.915	-24.0701	8.8	.608648	75.4	.15295	.589117
J21	-137.915	-24.0701	17.6	.23144	77.	.0519414	.225536
2J1	-137.915	-24.0701	17.6	.23144	77.	.0519414	.225536
52	-137.915	-24.0701	26.37	.0135516	152.7	-.0120435	6.21E-03
J22	-137.915	-24.0701	35.14	.17685	248.4	-.0650551	-.16445
2J1	-137.915	-24.0701	35.14	.17685	248.4	-.0650551	-.16445
54	-137.915	-24.0701	39.52	.226889	249.1	-.0809324	-.211964
J23	-137.915	-24.0701	43.9	.27174	249.4	-.0956401	-.254353
2J1	-137.915	-24.0701	43.9	.27174	249.4	-.0956401	-.254353
56	-137.915	-24.0701	48.3	.2971	249.4	-.104427	-.278142
J24	-137.915	-24.0701	52.7	.314777	249.3	-.111093	-.294522
2J1	-137.915	-24.0701	52.7	.314777	249.3	-.111093	-.294522
58	-137.915	-24.0701	62.275	.31495	249.	-.112952	-.293999
59	-137.915	-24.0701	71.85	.266973	248.4	-.0981343	-.248283
60	-137.915	-24.0701	81.425	.17005	247.8	-.0643371	-.15741
END	-137.915	-24.0701	91.	0	0	0	0
GND	-213.087	156.528	0	.321224	185.	-.320011	-.0278844
62	-213.087	156.528	8.8	.110385	183.4	-.110189	-6.58E-03
J26	-213.087	156.528	17.6	.0344301	164.	-.0330991	9.48E-03
2J1	-213.087	156.528	17.6	.0344301	164.	-.0330991	9.48E-03
64	-213.087	156.528	26.37	.0250715	71.7	7.86E-03	.0238061
J27	-213.087	156.528	35.14	.0523036	49.8	.033726	.0399777
2J1	-213.087	156.528	35.14	.0523036	49.8	.033726	.0399777
66	-213.087	156.528	39.52	.060156	49.4	.0391372	.0456839
J28	-213.087	156.528	43.9	.0670543	50.3	.0428141	.0516065
2J1	-213.087	156.528	43.9	.0670543	50.3	.0428141	.0516065
68	-213.087	156.528	48.3	.070771	51.8	.0437696	.0556126
J29	-213.087	156.528	52.7	.0731122	53.8	.0431609	.0590129
2J1	-213.087	156.528	52.7	.0731122	53.8	.0431609	.0590129
70	-213.087	156.528	62.525	.0722229	59.5	.0366197	.0622507
71	-213.087	156.528	72.35	.0621338	65.8	.025482	.0566681
72	-213.087	156.528	82.175	.0409599	71.9	.0127504	.0389248
END	-213.087	156.528	92.	0	0	0	0

WLXX-AM License Corp
WRTO (AM) 1200 kHz
20 kW DA-D 4.5 kW DA-N
Facility ID 11196
Chicago, Illinois
Amendment
Day Base Corrections

Tower 1

branch	label	nodes		value	function	tolerance	condition
1	V1	0	0	1.			
2	R1	1	0	100.K			
3	R2	1	2	0.1			
4	C1	2	0	8.p			
5	L1	2	3	3.5u			
6	C2	3	0	30.p			
7	R3	3	0	77.894	J-18.604		

freq	probe	value	dB	phase	phase delay
1.2M	V:1	775.618u	-62.207	4.542	-10.5128n
1.2M	V:2	774.622u	-62.218	4.547	-10.5264n
1.2M	V:3	797.058u	-61.970	-14.708	34.0472n
1.2M	I:R2	9.99227u	-100.007	-0.004	8.15169p
1.2M	I:R3	9.95266u	-100.041	-1.276	2.95293n

In/Out = IR2/IR3 = 1.0039 + 1.272 deg

Tower 2

branch	label	nodes		value	function	tolerance	condition
1	V1	0	0	1.			
2	R1	1	0	100.K			
3	R2	1	2	0.1			
4	C1	2	0	8.p			
5	L1	2	3	3.u			
6	C2	3	0	30.p			
7	R3	3	0	-67.631	J-67.838		

-->ac 1.2m

freq	probe	value	dB	phase	phase delay
1.2M	V:1	793.959u	-62.004	-145.145	335.983n
1.2M	V:2	794.781u	-61.995	-145.186	336.079n
1.2M	V:3	941.37u	-60.525	-133.797	309.716n
1.2M	I:R2	10.0065u	-99.994	0.026	-60.1415p
1.2M	I:R3	9.82731u	-100.151	1.115	-2.58153n

R2/R3= 1.0182 Ph = -1.09

Tower 3

branch	label	nodes		value	function	tolerance	condition
1	V1	0	0	1.			
2	R1	1	0	100.K			
3	R2	1	2	0.1			
4	C1	2	0	8.p			
5	L1	2	3	1.99u			
6	C2	3	0	30.p			
7	R3	3	0	45.131	J-15.04		

-->ac 1.2m

freq	probe	value	dB	phase	phase delay
1.2M	V:1	449.015u	-66.955	-0.716	1.65832n
1.2M	V:2	448.015u	-66.974	-0.718	1.66202n
1.2M	V:3	473.846u	-66.487	-19.168	44.3709n
1.2M	I:R2	9.99551u	-100.004	0.000	-744.92E-15
1.2M	I:R3	9.9608u	-100.034	-0.737	1.7071n

R2/R3 =1.00348 .737 deg

Tower 4

branch	label	nodes		value	function	tolerance	condition
1	V1	0	0	1.			
2	R1	1	0	100.K			
3	R2	1	2	0.1			
4	C1	2	0	8.p			
5	L1	2	3	3.u			
6	C2	3	0	30.p			
7	R3	3	0	14.14	J-27.15		

-->ac 1.2m

freq	probe	value	dB	phase	phase delay
1.2M	V:1	147.366u	-76.632	-17.448	40.3884n
1.2M	V:2	146.412u	-76.688	-17.565	40.66n
1.2M	V:3	304.121u	-70.339	-62.717	145.178n
1.2M	I:R2	9.99859u	-100.001	0.003	-5.86112p
1.2M	I:R3	9.93487u	-100.057	-0.228	527.461p

I R2/IR3 = 1.0064 + .231 deg

WLXX-AM License Corp
WRTO (AM) 1200 kHz
20 kW DA-D 4.5 kW DA-N
Facility ID 11196
Chicago, Illinois
Amendment
NIGHT Model

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

wire	caps	Radius	Angle	Z	radius	segs
1	none	0	0	0	1.5039	2
		0	0	17.6		
2	none	0	0	17.6	1.0188	2
		0	0	35.14		
3	none	0	0	35.14	.6986	2
		0	0	43.9		
4	none	0	0	43.9	.4656	2
		0	0	52.7		
5	none	0	0	52.7	.395	4
		0	0	92.2		
6	none	88.5	207.8	0	1.5039	2
		88.5	207.8	17.6		
7	none	88.5	207.8	17.6	1.0188	2
		88.5	207.8	35.14		
8	none	88.5	207.8	35.14	.6986	2
		88.5	207.8	43.9		
9	none	88.5	207.8	43.9	.4656	2
		88.5	207.8	52.7		
10	none	88.5	207.8	52.7	.395	4
		88.5	207.8	91.		
11	none	125.2	125.8	0	1.5039	2
		125.2	125.8	17.6		
12	none	125.2	125.8	17.6	1.0188	2
		125.2	125.8	35.14		
13	none	125.2	125.8	35.14	.6986	2
		125.2	125.8	43.9		
14	none	125.2	125.8	43.9	.4656	2
		125.2	125.8	52.7		
15	none	125.2	125.8	52.7	.395	4
		125.2	125.8	92.		
16	none	225.	134.7	0	1.5039	2
		225.	134.7	17.6		
17	none	225.	134.7	17.6	1.0188	2
		225.	134.7	35.14		
18	none	225.	134.7	35.14	.6989	2
		225.	134.7	43.9		
19	none	225.	134.7	43.9	.4656	2
		225.	134.7	52.7		
20	none	225.	134.7	52.7	.395	4
		225.	134.7	91.5		
21	none	140.	189.9	0	1.5039	2
		140.	189.9	17.6		

22	none	140.	189.9	17.6	1.0188	2
		140.	189.9	35.14		
23	none	140.	189.9	35.14	.6986	2
		140.	189.9	43.9		
24	none	140.	189.9	43.9	.4656	2
		140.	189.9	52.7		
25	none	140.	189.9	52.7	.395	4
		140.	189.9	91.		
26	none	264.4	143.7	0	1.5039	2
		264.4	143.7	17.6		
27	none	264.4	143.7	17.6	1.0188	2
		264.4	143.7	35.14		
28	none	264.4	143.7	35.14	.6989	2
		264.4	143.7	43.9		
29	none	264.4	143.7	43.9	.4656	2
		264.4	143.7	52.7		
30	none	264.4	143.7	52.7	.395	4
		264.4	143.7	92.		

Number of wires = 30
current nodes = 72

	minimum		maximum	
Individual wires	wire	value	wire	value
segment length	3	4.38	5	9.875
radius	5	.395	1	1.5039

ELECTRICAL DESCRIPTION
Frequencies (MHz)

	frequency		no. of	segment length (wavelengths)	
no.	lowest	step	steps	minimum	maximum
1	1.2	0	1	.0121667	.0274306

Sources

source	node	sector	magnitude	phase	type
1	1	1	557.017	317.4	voltage
2	13	1	301.97	345.8	voltage
3	25	1	517.182	349.4	voltage
4	37	1	273.09	32.1	voltage
5	49	1	242.876	32.	voltage
6	61	1	215.4	64.4	voltage

IMPEDANCE
normalization = 50.

freq (MHz)	resist (ohms)	react (ohms)	imped (ohms)	phase (deg)	VSWR	S11 dB	S12 dB
source = 1; node 1, sector 1							
1.2	186.19	42.07	190.88	12.7	3.9278	-4.5222	-1.891
source = 2; node 13, sector 1							
1.2	24.133	-8.4034	25.554	340.8	2.1474	-8.7649	-.61928
source = 3; node 25, sector 1							
1.2	111.8	-84.658	140.24	322.9	3.6947	-4.822	-1.7357
source = 4; node 37, sector 1							

```
1.2      29.93    1.5857   29.972   3.       1.6732  -11.978  -.28455

source =  5; node 49, sector 1
1.2      -.62499  -20.523  20.532   268.3    ****    ****     ****

source =  6; node 61, sector 1
1.2      2.1167   -27.768  27.848   274.4    30.916  -.56209  -9.1578


CURRENT rms
Frequency   = 1.2 MHz
Input power = 4,500. watts
Efficiency  = 100. %
coordinates in degrees
current                                  mag      phase  real      imaginary
no.    X         Y         Z            (amps)   (deg)  (amps)    (amps)
GND    0         0         0            2.06345  304.7  1.1734    -1.69734
 2     0         0         8.8          2.36569  284.6  .594808   -2.28969
J1     0         0         17.6         2.46616  278.1  .347457   -2.44156
2J1    0         0         17.6         2.46616  278.1  .347457   -2.44156
 4     0         0         26.37        2.46637  274.4  .190317   -2.45901
J2     0         0         35.14        2.36424  271.4  .0573415  -2.36355
2J1    0         0         35.14        2.36424  271.4  .0573415  -2.36355
 6     0         0         39.52        2.2931   270.4  .0161395  -2.29304
J3     0         0         43.9         2.1928   269.4  -.0239519 -2.19267
2J1    0         0         43.9         2.1928   269.4  -.0239519 -2.19267
 8     0         0         48.3         2.09501  268.6  -.0501532 -2.09441
J4     0         0         52.7         1.97237  267.9  -.0731263 -1.97102
2J1    0         0         52.7         1.97237  267.9  -.0731263 -1.97102
 10    0         0         62.575       1.64217  266.5  -.10056   -1.63909
 11    0         0         72.45        1.21479  265.3  -.0998296 -1.21068
 12    0         0         82.325       .694009  264.2  -.070025  -.690468
END    0         0         92.2         0        0      0         0
GND    -78.2854  -41.2752  0            8.35584  5.     8.32451   .722898
 14    -78.2854  -41.2752  8.8          8.1114   2.     8.10665   .277797
J6     -78.2854  -41.2752  17.6         7.72642  .7     7.7258    .0983383
2J1    -78.2854  -41.2752  17.6         7.72642  .7     7.7258    .0983383
 16    -78.2854  -41.2752  26.37        7.26088  359.9  7.26087   -8.04E-03
J7     -78.2854  -41.2752  35.14        6.5583   359.2  6.5577    -.088501
2J1    -78.2854  -41.2752  35.14        6.5583   359.2  6.5577    -.088501
 18    -78.2854  -41.2752  39.52        6.22701  359.   6.22604   -.110115
J8     -78.2854  -41.2752  43.9         5.81612  358.7  5.8147    -.128848
2J1    -78.2854  -41.2752  43.9         5.81612  358.7  5.8147    -.128848
 20    -78.2854  -41.2752  48.3         5.45692  358.5  5.45515   -.138803
J9     -78.2854  -41.2752  52.7         5.03862  358.4  5.03653   -.144977
2J1    -78.2854  -41.2752  52.7         5.03862  358.4  5.03653   -.144977
 22    -78.2854  -41.2752  62.275       4.05931  358.   4.05685   -.141287
 23    -78.2854  -41.2752  71.85        2.91603  357.7  2.91369   -.116727
 24    -78.2854  -41.2752  81.425       1.62278  357.4  1.62116   -.0724631
END    -78.2854  -41.2752  91.          0        0      0         0
GND    -73.2367  101.545   0            2.60777  26.5   2.33321   1.16474
 26    -73.2367  101.545   8.8          2.19673  10.2   2.16191   .389528
J11    -73.2367  101.545   17.6         2.02005  2.     2.01879   .0712857
2J1    -73.2367  101.545   17.6         2.02005  2.     2.01879   .0712857
 28    -73.2367  101.545   26.37        1.87728  356.3  1.87341   -.120395
J12    -73.2367  101.545   35.14        1.69575  350.9  1.67448   -.267712
2J1    -73.2367  101.545   35.14        1.69575  350.9  1.67448   -.267712
```

30	-73.2367	101.545	39.52	1.6143	349.	1.58474	-.307487
J13	-73.2367	101.545	43.9	1.51464	347.	1.47557	-.341765
2J1	-73.2367	101.545	43.9	1.51464	347.	1.47557	-.341765
32	-73.2367	101.545	48.3	1.4278	345.4	1.38179	-.35953
J14	-73.2367	101.545	52.7	1.32654	343.8	1.27398	-.36971
2J1	-73.2367	101.545	52.7	1.32654	343.8	1.27398	-.36971
34	-73.2367	101.545	62.525	1.08008	340.7	1.01968	-.35613
35	-73.2367	101.545	72.35	.785069	338.	.727749	-.294473
36	-73.2367	101.545	82.175	.442275	335.4	.40215	-.184071
END	-73.2367	101.545	92.	0	0	0	0
GND	-158.264	159.93	0	6.44289	29.1	5.63071	3.13143
38	-158.264	159.93	8.8	6.39573	25.4	5.77572	2.74707
J16	-158.264	159.93	17.6	6.15397	24.	5.6228	2.50109
2J1	-158.264	159.93	17.6	6.15397	24.	5.6228	2.50109
40	-158.264	159.93	26.37	5.8244	23.1	5.35921	2.28089
J17	-158.264	159.93	35.14	5.29909	22.2	4.90517	2.0049
2J1	-158.264	159.93	35.14	5.29909	22.2	4.90517	2.0049
42	-158.264	159.93	39.52	5.04543	22.	4.67957	1.88626
J18	-158.264	159.93	43.9	4.72776	21.7	4.39401	1.74482
2J1	-158.264	159.93	43.9	4.72776	21.7	4.39401	1.74482
44	-158.264	159.93	48.3	4.4476	21.4	4.13982	1.62574
J19	-158.264	159.93	52.7	4.11923	21.2	3.83995	1.49092
2J1	-158.264	159.93	52.7	4.11923	21.2	3.83995	1.49092
46	-158.264	159.93	62.4	3.33144	20.8	3.114	1.18383
47	-158.264	159.93	72.1	2.40118	20.5	2.24963	.839536
48	-158.264	159.93	81.8	1.33996	20.2	1.2579	.461689
END	-158.264	159.93	91.5	0	0	0	0
GND	-137.915	-24.0701	0	8.3644	123.7	-4.64532	6.95588
50	-137.915	-24.0701	8.8	7.89428	123.8	-4.39152	6.56004
J21	-137.915	-24.0701	17.6	7.42302	123.8	-4.12722	6.16987
2J1	-137.915	-24.0701	17.6	7.42302	123.8	-4.12722	6.16987
52	-137.915	-24.0701	26.37	6.91406	123.7	-3.83945	5.75003
J22	-137.915	-24.0701	35.14	6.19204	123.6	-3.43055	5.15486
2J1	-137.915	-24.0701	35.14	6.19204	123.6	-3.43055	5.15486
54	-137.915	-24.0701	39.52	5.86162	123.6	-3.24385	4.88222
J23	-137.915	-24.0701	43.9	5.45678	123.5	-3.01544	4.54792
2J1	-137.915	-24.0701	43.9	5.45678	123.5	-3.01544	4.54792
56	-137.915	-24.0701	48.3	5.10696	123.5	-2.81851	4.25876
J24	-137.915	-24.0701	52.7	4.70322	123.4	-2.59179	3.92465
2J1	-137.915	-24.0701	52.7	4.70322	123.4	-2.59179	3.92465
58	-137.915	-24.0701	62.275	3.76985	123.3	-2.06978	3.15084
59	-137.915	-24.0701	71.85	2.6953	123.1	-1.47349	2.25686
60	-137.915	-24.0701	81.425	1.49322	123.	-.812383	1.25289
END	-137.915	-24.0701	91.	0	0	0	0
GND	-213.087	156.528	0	5.46932	150.	-4.73792	2.73232
62	-213.087	156.528	8.8	5.07903	149.7	-4.38642	2.56043
J26	-213.087	156.528	17.6	4.74396	149.5	-4.0883	2.40644
2J1	-213.087	156.528	17.6	4.74396	149.5	-4.0883	2.40644
64	-213.087	156.528	26.37	4.40056	149.3	-3.78472	2.24518
J27	-213.087	156.528	35.14	3.92854	149.1	-3.36983	2.01934
2J1	-213.087	156.528	35.14	3.92854	149.1	-3.36983	2.01934
66	-213.087	156.528	39.52	3.71594	149.	-3.18381	1.91614
J28	-213.087	156.528	43.9	3.45721	148.8	-2.95797	1.78961
2J1	-213.087	156.528	43.9	3.45721	148.8	-2.95797	1.78961
68	-213.087	156.528	48.3	3.23521	148.7	-2.76472	1.68014
J29	-213.087	156.528	52.7	2.9804	148.6	-2.54349	1.55352
2J1	-213.087	156.528	52.7	2.9804	148.6	-2.54349	1.55352

70	-213.087	156.528	62.525	2.37941	148.3	-2.02397	1.25105
71	-213.087	156.528	72.35	1.69319	147.9	-1.43492	.898827
72	-213.087	156.528	82.175	.932606	147.6	-.787054	.500299
END	-213.087	156.528	92.	0	0	0	0

WRTO Night
MEDIUM WAVE ARRAY SYNTHESIS FROM FIELD RATIOS

Frequency = 1.2 MHz

tower	field ratio magnitude	phase (deg)
1	.345	-85.8
2	1.	0
3	.261	-4.1
4	.806	23.1
5	.952	123.6
6	.61	149.1

VOLTAGES AND CURRENTS - rms

source node	voltage magnitude	phase (deg)	current magnitude	phase (deg)
1	393.871	317.4	2.06348	304.7
13	213.525	345.8	8.35578	5.
25	365.703	349.4	2.60776	26.5
37	193.104	32.1	6.44296	29.1
49	171.739	32.	8.36435	123.7
61	152.311	64.4	5.46925	150.

Sum of square of source currents = 444.529
Total power = 4,500. watts

TOWER ADMITTANCE MATRIX

admittance	real (mhos)	imaginary (mhos)
Y(1, 1)	.05336	.00191014
Y(1, 2)	-.0669375	-.0152289
Y(1, 3)	-.0266352	.0067134
Y(1, 4)	.0351528	.012268
Y(1, 5)	.043546	.0236281
Y(1, 6)	-.0323917	-.0176324
Y(2, 1)	-.066941	-.0152345
Y(2, 2)	.138283	.0491559
Y(2, 3)	.0360132	.0098924
Y(2, 4)	-.0351403	-.0256067
Y(2, 5)	-.0935667	-.0475884
Y(2, 6)	.0366782	.0219748
Y(3, 1)	-.026636	.00671258
Y(3, 2)	.0360125	.00989073
Y(3, 3)	.0427269	-.00996428
Y(3, 4)	-.0636508	-.000559859
Y(3, 5)	-.0333775	-.00201207
Y(3, 6)	.0513761	.0200009
Y(4, 1)	.0351539	.0122705
Y(4, 2)	-.0351422	-.0256071
Y(4, 3)	-.0636506	-.000561834
Y(4, 4)	.155025	.045794
Y(4, 5)	.0293188	.0173547
Y(4, 6)	-.11904	-.0596678
Y(5, 1)	.0435476	.0236326
Y(5, 2)	-.0935673	-.0475888
Y(5, 3)	-.0333781	-.00201379
Y(5, 4)	.0293164	.0173547
Y(5, 5)	.0810752	.0461057

Y(5, 6)	-.0290403	-.0124628
Y(6, 1)	-.0323927	-.017633
Y(6, 2)	.0366803	.0219728
Y(6, 3)	.0513749	.0200003
Y(6, 4)	-.119039	-.0596615
Y(6, 5)	-.0290425	-.0124612
Y(6, 6)	.106354	.0710984

TOWER IMPEDANCE MATRIX

impedance	real (ohms)	imaginary (ohms)
Z(1, 1)	34.3915	-6.45622
Z(1, 2)	14.3291	-17.5737
Z(1, 3)	4.44387	-18.4396
Z(1, 4)	-12.2775	1.14204
Z(1, 5)	-2.6854	-20.1444
Z(1, 6)	-9.03231	9.52128
Z(2, 1)	14.3269	-17.5743
Z(2, 2)	31.9149	-14.5358
Z(2, 3)	-3.02791	-16.8854
Z(2, 4)	-12.9754	.330398
Z(2, 5)	25.0361	-11.4308
Z(2, 6)	-11.7049	4.89599
Z(3, 1)	4.44345	-18.4398
Z(3, 2)	-3.02755	-16.8863
Z(3, 3)	35.3227	-3.5816
Z(3, 4)	11.965	-18.4035
Z(3, 5)	-2.10597	-15.4142
Z(3, 6)	-3.67696	-19.2271
Z(4, 1)	-12.2773	1.14206
Z(4, 2)	-12.9757	.33011
Z(4, 3)	11.9646	-18.4031
Z(4, 4)	34.0663	-14.1517
Z(4, 5)	-10.6678	-7.35551
Z(4, 6)	27.9395	-11.1467
Z(5, 1)	-2.68657	-20.1437
Z(5, 2)	25.0358	-11.431
Z(5, 3)	-2.10661	-15.4137
Z(5, 4)	-10.6682	-7.35538
Z(5, 5)	35.2794	-12.26
Z(5, 6)	-11.0982	-5.98108
Z(6, 1)	-9.03203	9.52131
Z(6, 2)	-11.7053	4.89592
Z(6, 3)	-3.67657	-19.2266
Z(6, 4)	27.941	-11.1454
Z(6, 5)	-11.0981	-5.9814
Z(6, 6)	35.7674	-11.534

WLXX-AM License Corp
WRTO (AM) 1200 kHz
20 kW DA-D 4.5 kW DA-N
Facility ID 11196
Chicago, Illinois

WRTO Night Base Correction

Tower 1

branch	label	nodes		value	function	tolerance	condition
1	V1	0	0	1.			
2	R1	1	0	100.K			
3	R2	1	2	0.1			
4	C1	2	0	8.p			
5	L1	2	3	3.5u			
6	C2	3	0	30.p			
7	R3	3	0	186.19	J 42.07		

-->ac 1.2m

freq	probe	value	dB	phase	phase delay
1.2M	V:1	0.00199397	-54.006	17.097	-39.5758n
1.2M	V:2	0.00199301	-54.010	17.105	-39.5954n
1.2M	V:3	0.00192872	-54.295	9.607	-22.238n
1.2M	Z:R1	199.397	22.997	17.097	-39.5758n
1.2M	I:R2	9.98094u	-100.017	-0.034	77.8955p
1.2M	I:R3	10.1041u	-99.910	-3.125	7.23492n

In/Out = IR2/IR3= .98781 +3.09

Tower 2

branch	label	nodes		value	function	tolerance	condition
1	V1	0	0	1.			
2	R1	1	0	100.K			
3	R2	1	2	0.1			
4	C1	2	0	8.p			
5	L1	2	3	3.u			
6	C2	3	0	30.p			
7	R3	3	0	24.133	J-8.4034		

-->ac 1.2m

freq	probe	value	dB	phase	phase delay
1.2M	V:1	279.744u	-71.065	30.199	-69.9051n
1.2M	V:2	278.881u	-71.092	30.302	-70.1443n
1.2M	V:3	255.209u	-71.862	-19.602	45.3753n
1.2M	Z:R1	27.9744	14.468	30.199	-69.9051n
1.2M	I:R2	9.99758u	-100.002	-0.008	18.6671p
1.2M	I:R3	9.98695u	-100.011	-0.403	933.766p

In/Out =R2/R3= 1.0011 PH = +.40

Tower 3

branch	label	nodes		value	function	tolerance	condition
1	V1	0	0	1.			
2	R1	1	0	100.K			
3	R2	1	2	0.1			
4	C1	2	0	8.p			
5	L1	2	3	1.99u			
6	C2	3	0	30.p			
7	R3	3	0	111.8	J-84.658		

-->ac 1.2m

freq	probe	value	dB	phase	phase delay
1.2M	V:1	0.0012814	-57.846	-33.631	77.8496n
1.2M	V:2	0.00128057	-57.852	-33.656	77.9069n
1.2M	V:3	0.00136826	-57.277	-38.885	90.0113n
1.2M	Z:R1	128.14	21.077	-33.631	77.8496n
1.2M	I:R2	9.98933u	-100.009	0.041	-94.2264p
1.2M	I:R3	9.75679u	-100.214	-1.751	4.05299n

In/Out = IR2/IR3= 1.023833658 Ph =+1.79 deg

Tower 4

branch	label	nodes		value	function	tolerance	condition
1	V1	0	0	1.			
2	R1	1	0	100.K			
3	R2	1	2	0.1			
4	C1	2	0	8.p			
5	L1	2	3	3.u			
6	C2	3	0	30.p			
7	R3	3	0	29.93	J 1.5857		

-->ac 1.2m

freq	probe	value	dB	phase	phase delay
1.2M	V:1	385.038u	-68.290	38.499	-89.1192n
1.2M	V:2	384.256u	-68.308	38.592	-89.3341n
1.2M	V:3	300.164u	-70.453	2.527	-5.85021n
1.2M	Z:R1	38.5038	15.855	38.499	-89.1192n
1.2M	I:R2	9.99699u	-100.003	-0.014	31.7993p
1.2M	I:R3	10.0148u	-99.987	-0.505	1.16996n

In/Out = IR2/IR3= .99822 Phase = +.491 deg

Tower 5

branch	label	nodes		value	function	tolerance	condition
1	V1	0	0	1.			
2	R1	1	0	100.K			
3	R2	1	2	0.1			
4	C1	2	0	8.p			
5	L1	2	3	3.1u			
6	C2	3	0	30.p			
7	R3	3	0	-0.62499	J-20.523		

-->ac 1.2m

freq	probe	value	dB	phase	phase delay
1.2M	V:1	29.9116u	-90.483	99.999	-231.479n
1.2M	V:2	30.1014u	-90.428	101.874	-235.819n
1.2M	V:3	204.414u	-73.790	-91.736	212.351n
1.2M	I:R2	10.0001u	-100.000	-0.002	3.90687p
1.2M	I:R3	9.95561u	-100.039	0.009	-19.7109p

R2/R3 = 1.00446 PH= -.01

Tower 6

branch	label	nodes		value	function	tolerance	condition
1	V1	0	0	1.			
2	R1	1	0	100.K			
3	R2	1	2	0.1			
4	C1	2	0	8.p			
5	L1	2	3	3.61u			
6	C2	3	0	30.p			
7	R3	3	0	2.1167	J-27.768		

-->ac 1.2m

freq	probe	value	dB	phase	phase delay
1.2M	V:1	22.2245u	-93.063	-9.770	22.6168n
1.2M	V:2	21.2397u	-93.457	-10.228	23.6765n
1.2M	V:3	276.735u	-71.159	-85.675	198.322n
1.2M	Z:R1	2.22245	3.468	-9.770	22.6168n
1.2M	I:R2	9.99978u	-100.000	0.000	-500.23E-15
1.2M	I:R3	9.93714u	-100.055	-0.034	79.3269p

IR2/IR3 = 1.0063 Phase = +.034 deg

WLXX-AM License Corp
WRTO (AM) 1200 kHz
20 kW DA-D 4.5 kW DA-N
Facility ID 11196
Chicago, Illinois
Antenna Monitor Parameters

WRTO DAY

T1 MOM CURRENT	T1 MOM PHASE	T2 MOM CURRENT	T2 MOM PHASE	T3 MOM CURRENT	T3 MOM PHASE	T4 MOM Current	T4 MOM Phase
10.6224	17	5.91876	124.1	16.2854	73.2	10.6731	145.3
T1 Base Ratio Correction	T1 Base Ph Correction	T2 Base Ratio Correction	T2 Base Ph Correction	T3 Base Ratio Corection	T3 Base Ph Correction	T4 Base Ratio Correction	T4 Base Ph Correction
1.0039	1.272	1.0182	-1.09	1.00348	0.737	1.0064	0.231
T1 Normalized Ratio	T1 Normalized Phase	T2 Normalized Ratio	T2 Normalized Phase	T3 Normalized Ratio	T3 Normalized Phase	T4 Normalized Ratio	T4 Normalized Phase
0.653	-55.7	0.369	49.07	1	0	0.6573	71.59

WRTO Night

T1 MOM CURRENT	T1 MOM PHASE	T2 MOM CURRENT	T2 MOM PHASE	T3 MOM CURRENT	T3 MOM Phase	T4 MOM Current	T4 MOM Phase	T5 MOM Current	T5 MOM Phase	T6 MOM Current	T6 MOM Phase
2.06345	-55.3	8.35584	5	2.60777	26.5	6.44289	29.1	8.3644	123.7	5.46932	150
T1 Base Ratio Correction	T1 Base Ph Correction	T2 Base Ratio Correction	T2 Base Ph Correction	T3 Base Ratio Correction	T3 Base PH Correction	T4 Base Ratio Corection	T4 Base PH Correction	T5 Base Ratio Correction	Base PH Correction	T 6Base Ratio Correction	T6 Base Ph Correction
0.98781	3.09	1.0011	0.4	1.02383	1.79	0.99822	0.491	1.00446	-0.01	1.0063	0.03
T1 Normalized Ratio	T1 Normalized Phase	T2 Normalized Ratio	T2 Normalized Phase	T3 Normalized Ratio	T3 Normalized Phase	T4 Normalized Ratio	T4 Normalized Phase	T5 Normalized Ratio	T5 Normalized Ratio	T6 Normalized Ratio	T6 Normalized Phase
0.244	-57.6	1.000	0.0	0.319	22.9	0.769	24.2	1.004	118.3	0.658	144.6