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)

KTRS-AM License, LLC

MAILING ADDRESS (Line 1) (Maximum 35 characters)
638 West Port Plaza

MAILING ADDRESS (Line 2) (Maximum 35 characters)

CITY	STATE OR COUNTRY (if foreign address)	ZIP CODE
St. Louis	MO	63146

TELEPHONE NUMBER (include area code)	CALL LETTERS	OTHER FCC IDENTIFIER (If applicable)
314-453-5500	KTRS	20359

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

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

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

C. If Yes, provide the following information:

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

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

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

SECTION II - APPLICANT INFORMATION		
1. NAME OF APPLICANT KTRS-AM License, LLC		
MAILING ADDRESS 638 West Port Plaza		
CITY St. Louis	STATE MO	ZIP CODE 63146

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
KTRS	St. Louis, MO	BESTA-20210428AAA		10/28/2021

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

☑ Yes ☐ No

If No, explain in an Exhibit.

Exhibit No.

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

☑ Yes ☐ No

If No, state exceptions in an Exhibit.

Exhibit No.

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

☐ Yes ☑ No

If Yes, explain in an Exhibit.

Exhibit No.

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

☐ Yes ☐ No

☑ Does not apply

If No, explain in an Exhibit.

Exhibit No.

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

☐ Yes ☑ No

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

Exhibit No.

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

☐ Yes ☑ No

If Yes, provide particulars as an Exhibit.

Exhibit No.

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

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

CERTIFICATION

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

☑ Yes ☐ No

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

Name	Signature	
Steve N. House	Steve N. House	
Title	Date	Telephone Number
CFO	10/27/2021	314-453-5545

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
KTRS-AM LICENSE, L.L.C.

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
KTRS	N/A	550	Unlimited	5.0	5.0

2. Station location	
State	City or Town
MISSOURI	ST. LOUIS

3. Transmitter location			
State	County	City or Town	Street address (or other identification)
IL	MADISON	E. ST. LOUIS	101 MUELLER LANE

4. Main studio location			
State	County	City or Town	Street address (or other identification)
MO	ST. LOUIS	ST. LOUIS	638 WEST PORT PLAZA

5. Remote control point location (specify only if authorized directional antenna)			
State	County	City or Town	Street address (or other identification)
MO	ST. LOUIS	ST. LOUIS	638 WEST PORT PLAZA

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

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

Attach as an Exhibit a detailed description of the sampling system as installed. Exhibit No. ENG.

8. Operating constants:	
RF common point or antenna current (in amperes) without modulation for night system 10.4	RF common point or antenna current (in amperes) without modulation for day system 9.72
Measured antenna or common point resistance (in ohms) at operating frequency Night 50.0 Day 52.9	Measured antenna or common point reactance (in ohms) at operating frequency Night 0.0 Day 72.1

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(WC)	101.9		.902			
2(E)	61.5		.704			
3(EC)	-41.4		1.136			
4(W)	0.0		1.000			

Manufacturer and type of antenna monitor: Potomac Instruments 1901-4

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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.
Steel Tower	135.8	T1/T2 136.8,T3 137.0, T4 136.9	T1/T4 138.1, T2 137.7, T3 138.2	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
38 ° 39 ' 45 "	90 ° 07 ' 43 "

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

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

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

N/A

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

Tower replacement and adjustment

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)
Kurt Gorman	
Address (include ZIP Code) Phasetek Inc. 550 California Rd., Unit 11 Quakertown, PA 18951	Date October 28, 2021 Telephone No. (Include Area Code) 215-536-6648

☐ Technical Director ☐ Registered Professional Engineer

☐ Chief Operator ☑ Technical Consultant

☐ Other (specify)

ENGINEERING STATEMENT CONCERNING

APPLICATION FOR LICENSE INFORMATION

EMPLOYING MOMENT METHOD MODELING

KTRS, 550 KHZ, DA-N

ST. LOUIS, MISSOURI

OCTOBER, 2021

PHASETEK INC.

ENGINEERING STATEMENT CONCERNING APPLICATION FOR LICENSE INFORMATION EMPLOYING MOMENT METHOD MODELING KTRS, 550 KHZ, DA-N ST. LOUIS, MISSOURI OCTOBER, 2021

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PHASETEK INC.

ENGINEERING STATEMENT CONCERNING APPLICATION FOR LICENSE INFORMATION EMPLOYING MOMENT METHOD MODELING KTRS, 550 KHZ, DA-N ST. LOUIS, MISSOURI OCTOBER, 2021

SUMMARY

Adjustment of the Antenna System and a Proof of Performance employing Moment Method Modeling were performed on Radio Station KTRS, 550 KHz, St. Louis, Missouri, after replacement of the East tower. The Day (ND) and Night (DA) radiation patterns remain as licensed. This report was prepared on behalf of KTRS-AM License, L.L.C., licensee of Radio Station KTRS.

SITE MODIFICATIONS

The KTRS Transmitter site is that as currently licensed. The East tower (#2) has been replaced. In addition, the sampling lines have been modified to equal electrical lengths and the antenna system adjusted. As there is no change to the currently licensed radiation patterns for KTRS, a survey of the towers is not included. A License Application employing Moment Method Modeling as set forth in Section 73.151(C) has been done to license KTRS under the new rules.

REFERENCE POINTS

Reference Points were measured at standard pattern minima and maxima for the Directional Night mode of operation. These Points and their measured field intensity are shown in Figure 12.

TOWER NUMBERING

The actual tower numbering utilized differs from the theoretical numbers in the FCC database. The tower numbers match the numbering on the last license (BZ-20090921AEB) under Night Directional Operation values. Numbering is as follows, Tower #1 (West Center), Tower #2 (East), Tower #3 (East Center), and Tower #4 (West).

PHASETEK INC.

ENGINEERING STATEMENT CONCERNING
APPLICATION FOR LICENSE INFORMATION
EMPLOYING MOMENT METHOD MODELING
KTRS, 550 KHZ, DA-N
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METHOD OF MOMENTS DETAIL

All Moment Method Modeling was done with Expert MININEC Broadcast Professional, Version 23. One wire was used to represent each Tower for Tower's #1, #2, and #4. Tower #3 is a large self supporting tower and was modeled with individual wires to represent legs and cross members. Towers were driven individually to verify the Model compared to measured impedance data. Once the Model was verified, the Night Directional Antenna System was computed. For the Directional mode, the complex voltage values for sources located at ground level were computed. These sources produce current moment sums for each Tower that, when normalized, equate to the Theoretical Field Parameters for each respective Tower. The computed current moments are shown in Figure 13.

MEASURING EQUIPMENT AND PERSONNEL

All Tower Resistance and Reactance measurements were made with a HP8753E Network Analyzer and Tunwall directional coupler. Before use, tests of known impedances were made to verify operation. All Field Intensity Measurements were made with a Potomac Instruments Field Intensity Meter, model PI 4100, Serial Number 249, calibrated on January 21, 2016. The meter was calibrated by Potomac Instruments, Frederick, Maryland. The meter was compared to a Potomac Instruments PI 4100, Serial Number 134, calibrated on June 19, 2019, and agreed. All measurements were taken by Phasetek Inc. personnel supervised by Kurt Gorman of Phasetek Inc.

DAY (ND) OPERATION

The KTRS non-directional Day operation utilizes the West tower of the Night array (tower #4). This tower has an electrical height of 89.6° and is currently licensed. The input power for Day is 5.0kW. Unused towers #1, #2, and #3 are detuned (open circuited) for Day operation.

PHASETEK INC.

ENGINEERING STATEMENT CONCERNING
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EMPLOYING MOMENT METHOD MODELING
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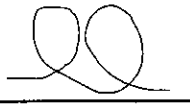
CONCLUSION

It is believed that the KTRS Antenna System has been constructed and adjusted in accordance with all applicable Commission rules and regulations. The foregoing was prepared on behalf of KTRS-AM License, L.L.C., under the immediate supervision of Kurt Gorman, Phasetek Inc., Quakertown, Pennsylvania, whose qualifications are a matter of record with the Federal Communications Commission. The statements herein are true and correct of his knowledge, except such statements made on information and belief, and as to these statements he believes them to be true and correct.



Kurt Gorman, President
Phasetek Inc.
Quakertown, Pennsylvania

FIGURE 1

ANTENNA SYSTEM AS ADJUSTED

APPLICATION FOR LICENSE INFORMATION
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ANTENNA SYSTEM DESCRIPTION

1. The Antenna System consists of four (4), vertical steel transmitting Towers. Towers 1, 2, and 4 are uniform cross section, guyed. Tower 3 is tapered, self supporting. All Towers stand 135.8M (89.6°) above their Base Insulators. The Towers are arranged with Tower 4 as a reference; Tower 1 is spaced 90.0° on a bearing of 94.0°T. Tower 2 is spaced 299.8° on a bearing of 91.2°T. Tower 3 is spaced 210.0° on a bearing of 90.0°T. All towers have aviation obstruction lighting. The lighting circuits are isolated at the base with a ring transformer for each tower.

2. The Ground System remains as currently licensed and consists of (120) buried copper Radials, 137.2M in length except where they intersect copper transverse straps between towers. In addition, a 18.3M by 18.3M copper ground screen is installed at the base of each tower. Copper strap connects all Towers to the main Transmitter grounding point.

3. The Sampling System consists of four (4), Delta Electronics model number TCT-3, 1.0 V/A Toroidal Current Transformers. All TCT's are at the Output of each Antenna Tuning Unit. These TCT's are connected to a Potomac Instruments 1901-4 Antenna Monitor via four (4) equal lengths of Cablewave, FCC-38-50J, 3/8" phase stabilized foam coaxial cable.

4. Tower registration numbers:
   Tower 1: 1033701
   Tower 2: 1033702
   Tower 3: 1033703
   Tower 4: 1033704

FIGURE 1
ANTENNA SYSTEM AS ADJUSTED

APPLICATION FOR LICENSE INFORMATION
EMPLOYING MOMENT METHOD MODELING
CONTINUED
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ANTENNA SYSTEM DESCRIPTION – Continued

NON-DIRECTIONAL OPERATION (DAY)

TOWER #4 (WEST) BASE

Impedance = 52.9 + j 72.1 Ohms
Current = 9.72 Amperes
Power = 5,000 Watts

DIRECTIONAL OPERATION (NIGHT)

COMMON POINT

Impedance = 50.0 + j 0.0 Ohms
Current = 10.4 Amperes
Power = 5,400 Watts

Directional Antenna Monitor indications are within ±5% and ±3° of the modeled TCT values.

FIGURE 2
KTRS SAMPLING SYSTEM DESCRIPTION/MEASUREMENTS

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SAMPLING SYSTEM DESCRIPTION

The Sampling System consists of Delta Electronics model number TCT-3 Toroidal Sampling Transformers (1.0 volt/amp) mounted at the base of each Tower. The sampling devices are connected to the Antenna Monitor with equal lengths of Cablewave FCC-38-50J. The Antenna Monitor is a Potomac Instruments Model 1901-4, Serial Number 499.

SAMPLE LINE MEASUREMENTS

Impedance measurements were made of the Antenna Sampling Lines using an Array Solutions VNA-2180 Network Analyzer. Measurements were done with the lines open circuited and then connected to the TCT's.

The table below shows the frequencies above and below the carrier frequency where resonance, defined as zero reactance corresponding with low resistance, was found. Frequencies of resonance occur at odd multiples of 90 degrees electrical length, the Sample Line length at the resonant frequency above the carrier frequency, which is the closest one to the carrier frequency, was found to be 270 electrical degrees. The electrical length at carrier frequency appearing in the table below was calculated by ratioing the frequencies.

SAMPLE LINE MEASUREMENTS

	Resonant Frequency (KHz) below 550 KHz	Resonant Frequency (KHz) above 550 KHz	Calculated Electrical Length (deg) at 550 KHz	Measured Impedance (ohms) Connected to TCT @ 550 KHz
Tower 1	198.02	600.59	247.3	51.8 –j 0.5
Tower 2	197.26	600.34	247.4	51.3 –j 0.5
Tower 3	197.60	600.10	247.5	52.9 –j 0.3
Tower 4	197.97	600.56	247.3	51.4 –j 0.3

FIGURE 2
SAMPLING SYSTEM DESCRIPTION/MEASUREMENTS

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CONTINUED
KTRS, 550 KHZ, DA-N
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SAMPLE LINE MEASUREMENTS (CONTINUED)

To determine the characteristic impedance values of the Sample Lines, open-circuited measurements were made with frequencies offset to produce ± 45 degrees of electrical length from resonance. The characteristic impedance was calculated using the following formula, where R1 +j X1 and R2 +j X2 are the measured impedances at the +45 and -45 degree offset frequencies, respectively:

$$Z_0 = ((R_1^2 + X_1^2)^{1/2} \bullet (R_2^2 + X_2^2)^{1/2})^{1/2}$$

Tower	+ 45 Degree Offset Frequency (kHz)	+ 45 Degree Measured Impedance (Ohms)	- 45 Degree Offset Frequency (kHz)	- 45 Degree Measured Impedance (Ohms)	Calculated Characteristic Impedance (Ohms)
1	700.70	12.5 +j 49.7	500.47	10.0 –j 49.5	50.87
2	700.42	12.6 +j 49.8	500.27	10.1 –j 49.6	50.99
3	700.14	12.4 +j 49.2	500.07	9.9 –j 49.0	50.36
4	700.67	12.5 +j 49.5	500.44	10.0 –j 49.6	50.83

SAMPLING TCT MEASUREMENTS

Measurements of the Delta Electronics TCT-3, 1.0 V/A Toroidal Current Transformers were performed by a Hewlett Packard 8752A, Network Analyzer. Measurements are normalized to Tower #4 (reference) and are within the manufacturer's rating of ± 1.5% and ± 2.0°.

FIGURE 2
SAMPLING SYSTEM DESCRIPTION/MEASUREMENTS

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SAMPLING TCT MEASUREMENTS CONT'D

TOWER	TCT SERIAL #	MAGNITUDE	PHASE
1	17760	.999	-0.1°
2	17754	.999	-0.2°
3	17758	.997	0.0°
4	17759	1.000	0.0°

ANTENNA MONITOR MEASUREMENT

Measurement of the Potomac Instruments Model 1901-4 Antenna Monitor was performed to verify calibration. A single RF Voltage was applied to the Reference Input (Tower #4) and each other Input by use of a "T" divider and equal electrical length coaxial cables. This yields the following:

Tower	Ratio	Phase
1	1.000	0.0°
2	1.000	0.0°
3	0.999	0.0°
4	1.000	0.0°

The above is within the manufacturer's rating of $\pm$ 1.0% and $\pm$ 1.0°.

FIGURE 3
TOWER IMPEDANCE MEASUREMENTS COMPARED TO METHOD OF MOMENTS MODEL
KTRS, 550 KHZ, DA-N
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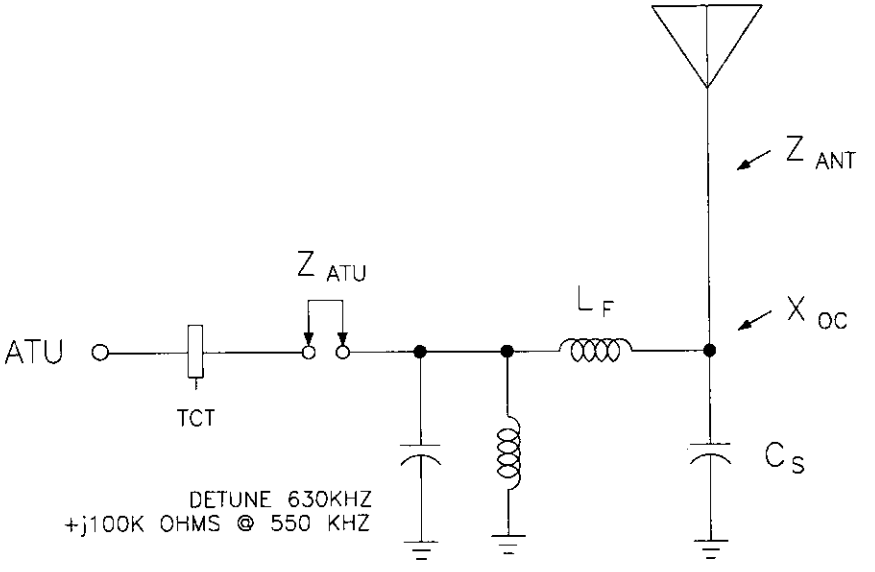

TOWER	Specified Cs (pf)	Measured L_F (µH)	Measured X_F (Ω)	Modeled Z_{ANT} (Ω)	Modeled Z_{ATU} (Ω)	Measured Z_{ATU} (Ω)
1	10	5.27	+j18.2	50.71 +j 54.72	50.83 +j 72.91	51.8 +j 72.9
2	10	6.48	+j22.4	51.07 +j 53.68	51.18 +j 76.06	50.1 +j 76.1
3	40	5.79	+j20.0	22.28 –j 24.55	22.13 –j 4.53	23.2 –j 4.5
4	10	5.35	+j18.5	51.71 +j 53.57	51.83 +j 72.05	52.9 +j 72.1

Tower	Calculated X_{OC} (Ω)
1	-j 40,717.8
2	-j 40,717.1
3	-j 7,798.3
4	-j 40,717.7

FIGURE 4
MOMENT MODEL PARAMETERS

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Tower #	Wire #	# of Segments	Base Node
1	1	12	1
2	2	12	13
3	3-39	365	25
4	40	12	406

Tower #	Physical Height Degrees	Modeled Height Degrees	Modeled Radius Meters	% of Equivalent Radius
1	89.6	96.5	.5821	100.0
2	89.6	96.5	.5821	100.0
3	89.6	83.0	---	---
4	89.6	96.5	.5821	100.0

Towers 1, 2, and 4 are uniform cross section, guyed with Base Insulator and are three (3) sided with 48" face width. Tower 3 is tapered, self supporting, four (4) sided with 40 ft. face width at the base.

Base Insulators for towers 1, 2, and 4 are manufactured by Austin with an assumed capacity of 10pf (-j28,937.3 ohms @ 550 kHz). Tower 3 has four (4) base insulators, manufactured by Locke, with an assumed capacity of 10pF each, 40pF total (-j7,234.3 ohms @ 550 kHz).

All towers have detuning circuit for nearby 630 kHz. These measure +j 100,000 ohms @ 550 kHz. All towers have a ring transformer for lighting. These are not included in the model.

FIGURE 5
MOMENT SUMMARY FOR INDIVIDUAL TOWERS

KTRS TOWER 1 (OTHERS OPEN)

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

wire	caps	Distance	Angle	Z	radius	segs
1	none	90.	94.	0	.5821	12
		90.	94.	96.5		
2	none	299.8	91.2	0	.5821	12
		299.8	91.2	96.5		
3	none	210.	90.	0	.05	1
		210.	90.	1.		
4	none	210.	90.	1.	.05	4
		206.	88.88	1.		
5	none	210.	90.	1.	.05	4
		214.1	88.92	1.		
6	none	210.	90.	1.	.05	4
		214.1	91.08	1.		
7	none	210.	90.	1.	.05	4
		206.	91.12	1.		
8	none	206.	88.88	1.	.05	15
		207.	89.15	20.6		
9	none	214.1	88.92	1.	.05	15
		213.1	89.17	20.6		
10	none	214.1	91.08	1.	.05	15
		213.1	90.83	20.6		
11	none	206.	91.12	1.	.05	15
		207.	90.85	20.6		
12	none	207.	89.15	20.6	.05	15
		207.9	89.42	41.1		
13	none	213.1	89.17	20.6	.05	15
		212.1	89.43	41.1		
14	none	213.1	90.83	20.6	.05	15
		212.1	90.57	41.1		
15	none	207.	90.85	20.6	.05	15
		207.9	90.58	41.1		
16	none	207.9	89.42	41.1	.05	16
		208.8	89.68	61.7		
17	none	212.1	89.43	41.1	.05	16
		211.2	89.69	61.7		
18	none	212.1	90.57	41.1	.05	16
		211.2	90.31	61.7		
19	none	207.9	90.58	41.1	.05	16
		208.8	90.32	61.7		
20	none	208.8	89.68	61.7	.05	30
		209.8	89.95	83.		
21	none	211.2	89.69	61.7	.05	30
		210.2	89.95	83.		
22	none	211.2	90.31	61.7	.05	30
		210.2	90.05	83.		
23	none	208.8	90.32	61.7	.05	30
		209.8	90.05	83.		
24	none	207.	89.15	20.6	.05	4
		213.1	89.17	20.6		
25	none	213.1	89.17	20.6	.05	4
		213.1	90.83	20.6		
26	none	213.1	90.83	20.6	.05	4
		207.	90.85	20.6		
27	none	207.	90.85	20.6	.05	4
		207.	89.15	20.6		
28	none	207.9	89.42	41.1	.05	3
		212.1	89.43	41.1		

29	none	212.1	89.43	41.1	.05	3
		212.1	90.57	41.1		
30	none	212.1	90.57	41.1	.05	3
		207.9	90.58	41.1		
31	none	207.9	90.58	41.1	.05	3
		207.9	89.42	41.1		
32	none	208.8	89.68	61.7	.05	3
		211.2	89.69	61.7		
33	none	211.2	89.69	61.7	.05	3
		211.2	90.31	61.7		
34	none	211.2	90.31	61.7	.05	3
		208.8	90.32	61.7		
35	none	208.8	90.32	61.7	.05	3
		208.8	89.68	61.7		
36	none	209.8	89.95	83.	.05	1
		210.2	89.95	83.		
37	none	210.2	89.95	83.	.05	1
		210.2	90.05	83.		
38	none	210.2	90.05	83.	.05	1
		209.8	90.05	83.		
39	none	209.8	90.05	83.	.05	1
		209.8	89.95	83.		
40	none	0	0	0	.5821	12
		0	0	96.5		

Number of wires = 40
current nodes = 417

	minimum		maximum	
Individual wires	wire	value	wire	value
segment length	39	.366192	1	8.04167
radius	3	.05	1	.5821

ELECTRICAL DESCRIPTION
Frequencies (MHz)

	frequency		no. of	segment length (wavelengths)	
no.	lowest	step	steps	minimum	maximum
1	.55	0	1	1.02E-03	.022338

Sources

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

Lumped loads

load	node	resistance (ohms)	reactance (ohms)	inductance (mH)	capacitance (uF)	passive circuit
1	13	0	-40,717.8	0	0	0
2	25	0	-7,798.3	0	0	0
3	406	0	-40,717.7	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							
.55	50.708	54.719	74.602	47.2	2.8275	-6.4212	-1.1237

KTRS TOWER 2 (OTHERS OPEN)

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

wire	caps	Distance	Angle	Z	radius	segs
1	none	90.	94.	0	.5821	12
		90.	94.	96.5		
2	none	299.8	91.2	0	.5821	12
		299.8	91.2	96.5		
3	none	210.	90.	0	.05	1
		210.	90.	1.		
4	none	210.	90.	1.	.05	4
		206.	88.88	1.		
5	none	210.	90.	1.	.05	4
		214.1	88.92	1.		
6	none	210.	90.	1.	.05	4
		214.1	91.08	1.		
7	none	210.	90.	1.	.05	4
		206.	91.12	1.		
8	none	206.	88.88	1.	.05	15
		207.	89.15	20.6		
9	none	214.1	88.92	1.	.05	15
		213.1	89.17	20.6		
10	none	214.1	91.08	1.	.05	15
		213.1	90.83	20.6		
11	none	206.	91.12	1.	.05	15
		207.	90.85	20.6		
12	none	207.	89.15	20.6	.05	15
		207.9	89.42	41.1		
13	none	213.1	89.17	20.6	.05	15
		212.1	89.43	41.1		
14	none	213.1	90.83	20.6	.05	15
		212.1	90.57	41.1		
15	none	207.	90.85	20.6	.05	15
		207.9	90.58	41.1		
16	none	207.9	89.42	41.1	.05	16
		208.8	89.68	61.7		
17	none	212.1	89.43	41.1	.05	16
		211.2	89.69	61.7		
18	none	212.1	90.57	41.1	.05	16
		211.2	90.31	61.7		
19	none	207.9	90.58	41.1	.05	16
		208.8	90.32	61.7		
20	none	208.8	89.68	61.7	.05	30
		209.8	89.95	83.		
21	none	211.2	89.69	61.7	.05	30
		210.2	89.95	83.		
22	none	211.2	90.31	61.7	.05	30
		210.2	90.05	83.		
23	none	208.8	90.32	61.7	.05	30
		209.8	90.05	83.		
24	none	207.	89.15	20.6	.05	4
		213.1	89.17	20.6		
25	none	213.1	89.17	20.6	.05	4
		213.1	90.83	20.6		
26	none	213.1	90.83	20.6	.05	4
		207.	90.85	20.6		
27	none	207.	90.85	20.6	.05	4
		207.	89.15	20.6		
28	none	207.9	89.42	41.1	.05	3
		212.1	89.43	41.1		
29	none	212.1	89.43	41.1	.05	3
		212.1	90.57	41.1		
30	none	212.1	90.57	41.1	.05	3
		207.9	90.58	41.1		
31	none	207.9	90.58	41.1	.05	3
		207.9	89.42	41.1		
32	none	208.8	89.68	61.7	.05	3
		211.2	89.69	61.7		

33	none	211.2	89.69	61.7	.05	3
		211.2	90.31	61.7		
34	none	211.2	90.31	61.7	.05	3
		208.8	90.32	61.7		
35	none	208.8	90.32	61.7	.05	3
		208.8	89.68	61.7		
36	none	209.8	89.95	83.	.05	1
		210.2	89.95	83.		
37	none	210.2	89.95	83.	.05	1
		210.2	90.05	83.		
38	none	210.2	90.05	83.	.05	1
		209.8	90.05	83.		
39	none	209.8	90.05	83.	.05	1
		209.8	89.95	83.		
40	none	0	0	0	.5821	12
		0	0	96.5		

Number of wires = 40
current nodes = 417

	minimum		maximum	
Individual wires	wire	value	wire	value
segment length	39	.366192	1	8.04167
radius	3	.05	1	.5821

ELECTRICAL DESCRIPTION
Frequencies (MHz)

	frequency		no. of	segment length (wavelengths)	
no.	lowest	step	steps	minimum	maximum
1	.55	0	1	1.02E-03	.022338

Sources

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

Lumped loads

load	node	resistance (ohms)	reactance (ohms)	inductance (mH)	capacitance (uF)	passive circuit
1	1	0	-40,717.8	0	0	0
2	25	0	-7,798.3	0	0	0
3	406	0	-40,717.7	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							
.55	51.065	53.679	74.088	46.4	2.7677	-6.5734	-1.0797

KTRS TOWER 3 (OTHERS OPEN)

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

wire	caps	Distance	Angle	Z	radius	segs
1	none	90.	94.	0	.5821	12
		90.	94.	96.5		
2	none	299.8	91.2	0	.5821	12
		299.8	91.2	96.5		
3	none	210.	90.	0	.05	1
		210.	90.	1.		
4	none	210.	90.	1.	.05	4
		206.	88.88	1.		
5	none	210.	90.	1.	.05	4
		214.1	88.92	1.		
6	none	210.	90.	1.	.05	4
		214.1	91.08	1.		
7	none	210.	90.	1.	.05	4
		206.	91.12	1.		
8	none	206.	88.88	1.	.05	15
		207.	89.15	20.6		
9	none	214.1	88.92	1.	.05	15
		213.1	89.17	20.6		
10	none	214.1	91.08	1.	.05	15
		213.1	90.83	20.6		
11	none	206.	91.12	1.	.05	15
		207.	90.85	20.6		
12	none	207.	89.15	20.6	.05	15
		207.9	89.42	41.1		
13	none	213.1	89.17	20.6	.05	15
		212.1	89.43	41.1		
14	none	213.1	90.83	20.6	.05	15
		212.1	90.57	41.1		
15	none	207.	90.85	20.6	.05	15
		207.9	90.58	41.1		
16	none	207.9	89.42	41.1	.05	16
		208.8	89.68	61.7		
17	none	212.1	89.43	41.1	.05	16
		211.2	89.69	61.7		
18	none	212.1	90.57	41.1	.05	16
		211.2	90.31	61.7		
19	none	207.9	90.58	41.1	.05	16
		208.8	90.32	61.7		
20	none	208.8	89.68	61.7	.05	30
		209.8	89.95	83.		
21	none	211.2	89.69	61.7	.05	30
		210.2	89.95	83.		
22	none	211.2	90.31	61.7	.05	30
		210.2	90.05	83.		
23	none	208.8	90.32	61.7	.05	30
		209.8	90.05	83.		
24	none	207.	89.15	20.6	.05	4
		213.1	89.17	20.6		
25	none	213.1	89.17	20.6	.05	4
		213.1	90.83	20.6		
26	none	213.1	90.83	20.6	.05	4
		207.	90.85	20.6		
27	none	207.	90.85	20.6	.05	4
		207.	89.15	20.6		
28	none	207.9	89.42	41.1	.05	3
		212.1	89.43	41.1		
29	none	212.1	89.43	41.1	.05	3
		212.1	90.57	41.1		
30	none	212.1	90.57	41.1	.05	3
		207.9	90.58	41.1		
31	none	207.9	90.58	41.1	.05	3
		207.9	89.42	41.1		
32	none	208.8	89.68	61.7	.05	3
		211.2	89.69	61.7		

33	none	211.2	89.69	61.7	.05	3
		211.2	90.31	61.7		
34	none	211.2	90.31	61.7	.05	3
		208.8	90.32	61.7		
35	none	208.8	90.32	61.7	.05	3
		208.8	89.68	61.7		
36	none	209.8	89.95	83.	.05	1
		210.2	89.95	83.		
37	none	210.2	89.95	83.	.05	1
		210.2	90.05	83.		
38	none	210.2	90.05	83.	.05	1
		209.8	90.05	83.		
39	none	209.8	90.05	83.	.05	1
		209.8	89.95	83.		
40	none	0	0	0	.5821	12
		0	0	96.5		

Number of wires = 40
current nodes = 417

	minimum		maximum	
Individual wires	wire	value	wire	value
segment length	39	.366192	1	8.04167
radius	3	.05	1	.5821

ELECTRICAL DESCRIPTION
Frequencies (MHz)

	frequency		no. of	segment length (wavelengths)	
no.	lowest	step	steps	minimum	maximum
1	.55	0	1	1.02E-03	.022338

Sources

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

Lumped loads

load	node	resistance (ohms)	reactance (ohms)	inductance (mH)	capacitance (uF)	passive circuit
1	1	0	-40,717.8	0	0	0
2	13	0	-40,717.1	0	0	0
3	406	0	-40,717.7	0	0	0

IMPEDANCE
normalization = 50.

freq (MHz)	resist (ohms)	react (ohms)	imped (ohms)	phase (deg)	VSWR	S11 dB	S12 dB
source = 1; node 25, sector 1							
.55	22.277	-24.55	33.15	312.2	2.8845	-6.2829	-1.1654

KTRS TOWER 4 (OTHERS OPEN)

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

wire	caps	Distance	Angle	Z	radius	segs
1	none	90.	94.	0	.5821	12
		90.	94.	96.5		
2	none	299.8	91.2	0	.5821	12
		299.8	91.2	96.5		
3	none	210.	90.	0	.05	1
		210.	90.	1.		
4	none	210.	90.	1.	.05	4
		206.	88.88	1.		
5	none	210.	90.	1.	.05	4
		214.1	88.92	1.		
6	none	210.	90.	1.	.05	4
		214.1	91.08	1.		
7	none	210.	90.	1.	.05	4
		206.	91.12	1.		
8	none	206.	88.88	1.	.05	15
		207.	89.15	20.6		
9	none	214.1	88.92	1.	.05	15
		213.1	89.17	20.6		
10	none	214.1	91.08	1.	.05	15
		213.1	90.83	20.6		
11	none	206.	91.12	1.	.05	15
		207.	90.85	20.6		
12	none	207.	89.15	20.6	.05	15
		207.9	89.42	41.1		
13	none	213.1	89.17	20.6	.05	15
		212.1	89.43	41.1		
14	none	213.1	90.83	20.6	.05	15
		212.1	90.57	41.1		
15	none	207.	90.85	20.6	.05	15
		207.9	90.58	41.1		
16	none	207.9	89.42	41.1	.05	16
		208.8	89.68	61.7		
17	none	212.1	89.43	41.1	.05	16
		211.2	89.69	61.7		
18	none	212.1	90.57	41.1	.05	16
		211.2	90.31	61.7		
19	none	207.9	90.58	41.1	.05	16
		208.8	90.32	61.7		
20	none	208.8	89.68	61.7	.05	30
		209.8	89.95	83.		
21	none	211.2	89.69	61.7	.05	30
		210.2	89.95	83.		
22	none	211.2	90.31	61.7	.05	30
		210.2	90.05	83.		
23	none	208.8	90.32	61.7	.05	30
		209.8	90.05	83.		
24	none	207.	89.15	20.6	.05	4
		213.1	89.17	20.6		
25	none	213.1	89.17	20.6	.05	4
		213.1	90.83	20.6		
26	none	213.1	90.83	20.6	.05	4
		207.	90.85	20.6		
27	none	207.	90.85	20.6	.05	4
		207.	89.15	20.6		
28	none	207.9	89.42	41.1	.05	3
		212.1	89.43	41.1		
29	none	212.1	89.43	41.1	.05	3
		212.1	90.57	41.1		
30	none	212.1	90.57	41.1	.05	3
		207.9	90.58	41.1		
31	none	207.9	90.58	41.1	.05	3
		207.9	89.42	41.1		
32	none	208.8	89.68	61.7	.05	3
		211.2	89.69	61.7		
33	none	211.2	89.69	61.7	.05	3

		211.2	90.31	61.7		
34	none	211.2	90.31	61.7	.05	3
		208.8	90.32	61.7		
35	none	208.8	90.32	61.7	.05	3
		208.8	89.68	61.7		
36	none	209.8	89.95	83.	.05	1
		210.2	89.95	83.		
37	none	210.2	89.95	83.	.05	1
		210.2	90.05	83.		
38	none	210.2	90.05	83.	.05	1
		209.8	90.05	83.		
39	none	209.8	90.05	83.	.05	1
		209.8	89.95	83.		
40	none	0	0	0	.5821	12
		0	0	96.5		

Number of wires = 40
current nodes = 417

	minimum		maximum	
Individual wires	wire	value	wire	value
segment length	39	.366192	1	8.04167
radius	3	.05	1	.5821

ELECTRICAL DESCRIPTION
Frequencies (MHz)

	frequency		no. of	segment length (wavelengths)	
no.	lowest	step	steps	minimum	maximum
1	.55	0	1	1.02E-03	.022338

Sources

source	node	sector	magnitude	phase	type
1	406	1	1.	0	voltage

Lumped loads

load	node	resistance (ohms)	reactance (ohms)	inductance (mH)	capacitance (uF)	passive circuit
1	1	0	-40,717.8	0	0	0
2	13	0	-40,717.1	0	0	0
3	25	0	-7,798.3	0	0	0

IMPEDANCE
normalization = 50.

freq (MHz)	resist (ohms)	react (ohms)	imped (ohms)	phase (deg)	VSWR	S11 dB	S12 dB
source = 1; node 406, sector 1							
.55	51.709	53.565	74.451	46.	2.7468	-6.6283	-1.0644

FIGURE 6
MOMENT MODEL ARRAY SYNTHESIS
(DIRECTIONAL – NIGHT)

APPLICATION FOR LICENSE INFORMATION
EMPLOYING MOMENT METHOD MODELING
KTRS, 550 KHZ, DA-N
ST. LOUIS, MISSOURI
OCTOBER, 2021

KTRS NIGHT

MEDIUM WAVE ARRAY SYNTHESIS FROM FIELD RATIOS

Frequency = .55 MHz

tower	field ratio magnitude	phase (deg)
1	1.	0
2	.75	-45.
3	.893	-153.
4	1.19	-108.

VOLTAGES AND CURRENTS - rms

source node	voltage magnitude	phase (deg)	current magnitude	phase (deg)
1	392.941	109.	7.41939	358.1
13	207.893	11.	5.79176	317.6
25	287.464	197.7	9.33047	214.6
406	783.235	320.8	8.23397	256.1

Sum of square of source currents = 486.895
Total power = 5,000. watts

TOWER ADMITTANCE MATRIX

admittance	real (mhos)	imaginary (mhos)
Y(1, 1)	.00375452	-.00774148
Y(1, 2)	-.00225399	-.00370913
Y(1, 3)	-.00024837	.00972723
Y(1, 4)	.00367621	.00440692
Y(2, 1)	-.00225376	-.00370829
Y(2, 2)	.00550433	-.0111039
Y(2, 3)	-.00264169	.00902904
Y(2, 4)	-.00106368	.000365294
Y(3, 1)	-.000254584	.00972737
Y(3, 2)	-.00264948	.0090275
Y(3, 3)	.020654	.0114805
Y(3, 4)	.00203279	.000435992
Y(4, 1)	.00367575	.0044071
Y(4, 2)	-.00106434	.000365362
Y(4, 3)	.00203305	.000435783
Y(4, 4)	.00775335	-.00772915

TOWER IMPEDANCE MATRIX

impedance	real (ohms)	imaginary (ohms)
Z(1, 1)	50.7616	54.6933
Z(1, 2)	-19.6578	-9.34134
Z(1, 3)	6.83911	-17.7317
Z(1, 4)	25.9856	-24.9692
Z(2, 1)	-19.6581	-9.34164
Z(2, 2)	51.1365	53.6793
Z(2, 3)	16.9606	-17.1722

z(2, 4)	-7.9696	16.1666
z(3, 1)	6.82765	-17.7358
z(3, 2)	16.9443	-17.1849
z(3, 3)	22.2931	-24.5529
z(3, 4)	-12.821	-6.22597
z(4, 1)	25.9858	-24.9695
z(4, 2)	-7.9689	16.1661
z(4, 3)	-12.8187	-6.22976
z(4, 4)	51.728	53.5823

FIGURE 7
MOMENT MODEL SUMMARY FOR
DIRECTIONAL NIGHT MODE
APPLICATION FOR LICENSE INFORMATION
EMPLOYING MOMENT METHOD MODELING
KTRS, 550 KHZ, DA-N
ST. LOUIS, MISSOURI
OCTOBER, 2021

KTRS NIGHT

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

wire	caps	Distance	Angle	Z	radius	segs
1	none	90.	94.	0	.5821	12
		90.	94.	96.5		
2	none	299.8	91.2	0	.5821	12
		299.8	91.2	96.5		
3	none	210.	90.	0	.05	1
		210.	90.	1.		
4	none	210.	90.	1.	.05	4
		206.	88.88	1.		
5	none	210.	90.	1.	.05	4
		214.1	88.92	1.		
6	none	210.	90.	1.	.05	4
		214.1	91.08	1.		
7	none	210.	90.	1.	.05	4
		206.	91.12	1.		
8	none	206.	88.88	1.	.05	15
		207.	89.15	20.6		
9	none	214.1	88.92	1.	.05	15
		213.1	89.17	20.6		
10	none	214.1	91.08	1.	.05	15
		213.1	90.83	20.6		
11	none	206.	91.12	1.	.05	15
		207.	90.85	20.6		
12	none	207.	89.15	20.6	.05	15
		207.9	89.42	41.1		
13	none	213.1	89.17	20.6	.05	15
		212.1	89.43	41.1		
14	none	213.1	90.83	20.6	.05	15
		212.1	90.57	41.1		
15	none	207.	90.85	20.6	.05	15
		207.9	90.58	41.1		
16	none	207.9	89.42	41.1	.05	16
		208.8	89.68	61.7		
17	none	212.1	89.43	41.1	.05	16
		211.2	89.69	61.7		
18	none	212.1	90.57	41.1	.05	16
		211.2	90.31	61.7		
19	none	207.9	90.58	41.1	.05	16
		208.8	90.32	61.7		
20	none	208.8	89.68	61.7	.05	30
		209.8	89.95	83.		
21	none	211.2	89.69	61.7	.05	30
		210.2	89.95	83.		
22	none	211.2	90.31	61.7	.05	30
		210.2	90.05	83.		
23	none	208.8	90.32	61.7	.05	30
		209.8	90.05	83.		
24	none	207.	89.15	20.6	.05	4

		213.1	89.17	20.6		
25	none	213.1	89.17	20.6	.05	4
		213.1	90.83	20.6		
26	none	213.1	90.83	20.6	.05	4
		207.	90.85	20.6		
27	none	207.	90.85	20.6	.05	4
		207.	89.15	20.6		
28	none	207.9	89.42	41.1	.05	3
		212.1	89.43	41.1		
29	none	212.1	89.43	41.1	.05	3
		212.1	90.57	41.1		
30	none	212.1	90.57	41.1	.05	3
		207.9	90.58	41.1		
31	none	207.9	90.58	41.1	.05	3
		207.9	89.42	41.1		
32	none	208.8	89.68	61.7	.05	3
		211.2	89.69	61.7		
33	none	211.2	89.69	61.7	.05	3
		211.2	90.31	61.7		
34	none	211.2	90.31	61.7	.05	3
		208.8	90.32	61.7		
35	none	208.8	90.32	61.7	.05	3
		208.8	89.68	61.7		
36	none	209.8	89.95	83.	.05	1
		210.2	89.95	83.		
37	none	210.2	89.95	83.	.05	1
		210.2	90.05	83.		
38	none	210.2	90.05	83.	.05	1
		209.8	90.05	83.		
39	none	209.8	90.05	83.	.05	1
		209.8	89.95	83.		
40	none	0	0	0	.5821	12
		0	0	96.5		

Number of wires = 40
current nodes = 417

	minimum		maximum	
Individual wires	wire	value	wire	value
segment length	39	.366192	1	8.04167
radius	3	.05	1	.5821

ELECTRICAL DESCRIPTION
Frequencies (MHz)

	frequency		no. of	segment length (wavelengths)	
no.	lowest	step	steps	minimum	maximum
1	.55	0	1	1.02E-03	.022338

Sources

source	node	sector	magnitude	phase	type
1	1	1	555.702	109.	voltage
2	13	1	294.005	11.	voltage
3	25	1	406.535	197.7	voltage
4	406	1	1,107.66	320.8	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							
.55	-18.911	49.47	52.961	110.9	****	****	****
source = 2; node 13, sector 1							
.55	21.406	28.814	35.895	53.4	3.2301	-5.5606	-1.4142
source = 3; node 25, sector 1							
.55	29.486	-8.9338	30.809	343.1	1.7768	-11.065	-.35389
source = 4; node 406, sector 1							
.55	40.65	85.999	95.123	64.7	5.5	-3.194	-2.834

CURRENT rms
Frequency = .55 MHz
Input power = 5,000. watts
Efficiency = 100. %
coordinates in degrees

current no.	X	Y	Z	mag (amps)	phase (deg)	real (amps)	imaginary (amps)
GND	-6.27809	-89.7808	0	7.41937	358.1	7.41514	-.250437
2	-6.27809	-89.7808	8.04167	7.65491	358.9	7.65351	-.146444
3	-6.27809	-89.7808	16.0833	7.65429	359.4	7.65386	-.0806399
4	-6.27809	-89.7808	24.125	7.4874	359.8	7.48734	-.0294876
5	-6.27809	-89.7808	32.1667	7.16653	.1	7.16653	9.83E-03
6	-6.27809	-89.7808	40.2083	6.701	.3	6.70089	.0385381
7	-6.27809	-89.7808	48.25	6.10017	.5	6.0999	.0574011
8	-6.27809	-89.7808	56.2917	5.37424	.7	5.37382	.0671314
9	-6.27809	-89.7808	64.3333	4.53395	.9	4.53343	.0684677
10	-6.27809	-89.7808	72.375	3.58936	1.	3.58882	.0621776
11	-6.27809	-89.7808	80.4167	2.5469	1.1	2.54643	.0489714
12	-6.27809	-89.7808	88.4583	1.40048	1.2	1.40017	.029257
END	-6.27809	-89.7808	96.5	0	0	0	0
GND	-6.27853	-299.734	0	5.79176	317.6	4.27814	-3.90409
14	-6.27853	-299.734	8.04167	5.8797	316.6	4.27487	-4.03688
15	-6.27853	-299.734	16.0833	5.82175	316.	4.18923	-4.04266
16	-6.27853	-299.734	24.125	5.65043	315.5	4.03035	-3.96026
17	-6.27853	-299.734	32.1667	5.37282	315.	3.80215	-3.79617
18	-6.27853	-299.734	40.2083	4.99518	314.6	3.50903	-3.55507
19	-6.27853	-299.734	48.25	4.52432	314.2	3.15619	-3.24159
20	-6.27853	-299.734	56.2917	3.96775	313.9	2.74944	-2.86071
21	-6.27853	-299.734	64.3333	3.33343	313.5	2.29487	-2.4177
22	-6.27853	-299.734	72.375	2.62875	313.2	1.79822	-1.91749
23	-6.27853	-299.734	80.4167	1.8585	312.8	1.26332	-1.3631
24	-6.27853	-299.734	88.4583	1.01837	312.5	.687871	-.75094
END	-6.27853	-299.734	96.5	0	0	0	0
25	0	-210.	0	9.33044	214.6	-7.6842	-5.29247
J3	0	-210.	1.	9.32548	214.5	-7.68958	-5.27589
2J1	0	-210.	1.	2.34667	215.1	-1.92033	-1.34877
27	1.00664	-208.99	1.	2.33825	214.6	-1.92397	-1.32882
28	2.01328	-207.98	1.	2.32604	214.	-1.92777	-1.30161
29	3.01993	-206.971	1.	2.31244	213.4	-1.93051	-1.273
J4	4.02657	-205.961	1.	2.29829	212.8	-1.93231	-1.24431
2J1	0	-210.	1.	2.31909	214.	-1.92178	-1.29804
31	1.00886	-211.016	1.	2.31095	213.6	-1.92542	-1.27799
32	2.01772	-212.031	1.	2.29938	213.	-1.9294	-1.25082
33	3.02659	-213.047	1.	2.2864	212.3	-1.93228	-1.22226
J5	4.03545	-214.062	1.	2.27289	211.7	-1.93422	-1.19366
2J1	0	-210.	1.	2.31642	213.8	-1.9247	-1.28894
35	-1.00887	-211.016	1.	2.30836	213.3	-1.92833	-1.26888
36	-2.01773	-212.031	1.	2.29689	212.7	-1.93231	-1.24172
37	-3.0266	-213.047	1.	2.28401	212.1	-1.93518	-1.21318
J6	-4.03547	-214.062	1.	2.27062	211.4	-1.93713	-1.18459
2J1	0	-210.	1.	2.34372	214.9	-1.92277	-1.34014
39	-1.00665	-208.99	1.	2.33537	214.4	-1.92641	-1.32019
40	-2.01329	-207.98	1.	2.32325	213.8	-1.9302	-1.29299
41	-3.01994	-206.971	1.	2.30975	213.2	-1.93294	-1.26439
J7	-4.02659	-205.961	1.	2.29569	212.6	-1.93473	-1.23572
2J1	4.02657	-205.961	1.	2.29829	212.8	-1.93231	-1.24431
43	3.96285	-206.028	2.30667	2.28574	212.3	-1.93246	-1.22075
44	3.89913	-206.096	3.61333	2.27348	211.8	-1.93122	-1.19962
45	3.83541	-206.164	4.92	2.26097	211.5	-1.92863	-1.17998
46	3.77169	-206.232	6.22667	2.24797	211.1	-1.92474	-1.16135
47	3.70797	-206.3	7.53333	2.23435	210.8	-1.9196	-1.14344
48	3.64425	-206.367	8.84	2.22003	210.5	-1.91324	-1.12608
49	3.58053	-206.435	10.1467	2.20497	210.2	-1.9057	-1.10915
50	3.51681	-206.503	11.4533	2.18915	209.9	-1.89703	-1.09255
51	3.4531	-206.571	12.76	2.17258	209.7	-1.88728	-1.07624
52	3.38938	-206.638	14.0667	2.15531	209.5	-1.87652	-1.06021
53	3.32566	-206.706	15.3733	2.13743	209.3	-1.86485	-1.04447
54	3.26194	-206.774	16.68	2.11907	209.1	-1.85241	-1.0291
55	3.19822	-206.842	17.9867	2.10054	208.9	-1.83943	-1.01427
56	3.1345	-206.91	19.2933	2.0824	208.7	-1.82636	-1.00039
J8	3.07078	-206.977	20.6	2.06747	208.6	-1.81535	-.98942

2J1	4.03545	-214.062	1.	2.27289	211.7	-1.93422	-1.19366
58	3.97221	-213.996	2.30667	2.26091	211.2	-1.93447	-1.17027
59	3.90898	-213.931	3.61333	2.24913	210.7	-1.93331	-1.1493
60	3.84574	-213.865	4.92	2.23705	210.3	-1.93079	-1.1298
61	3.7825	-213.8	6.22667	2.22445	210.	-1.92696	-1.11132
62	3.71927	-213.734	7.53333	2.2112	209.6	-1.92186	-1.09356
63	3.65603	-213.668	8.84	2.19723	209.3	-1.91554	-1.07635
64	3.5928	-213.603	10.1467	2.18248	209.	-1.90802	-1.05956
65	3.52956	-213.537	11.4533	2.16696	208.8	-1.89937	-1.04311
66	3.46632	-213.471	12.76	2.15065	208.5	-1.88963	-1.02695
67	3.40309	-213.406	14.0667	2.13363	208.3	-1.87887	-1.01106
68	3.33985	-213.34	15.3733	2.11598	208.1	-1.86719	-.995465
69	3.27661	-213.275	16.68	2.09784	207.9	-1.85473	-.980248
70	3.21338	-213.209	17.9867	2.07949	207.7	-1.84172	-.965568
71	3.15014	-213.143	19.2933	2.06151	207.5	-1.82863	-.951815
J9	3.08691	-213.078	20.6	2.04668	207.4	-1.81756	-.940953
2J1	-4.03547	-214.062	1.	2.27062	211.4	-1.93713	-1.18459
73	-3.97223	-213.996	2.30667	2.25872	210.9	-1.93737	-1.16123
74	-3.909	-213.931	3.61333	2.24702	210.5	-1.9362	-1.14027
75	-3.84576	-213.865	4.92	2.23501	210.1	-1.93367	-1.12079
76	-3.78252	-213.8	6.22667	2.22247	209.7	-1.92983	-1.10232
77	-3.71929	-213.734	7.53333	2.20927	209.4	-1.92472	-1.08459
78	-3.65605	-213.668	8.84	2.19534	209.1	-1.91838	-1.06739
79	-3.59281	-213.603	10.1467	2.18064	208.8	-1.91086	-1.05063
80	-3.52958	-213.537	11.4533	2.16515	208.5	-1.90219	-1.03419
81	-3.46634	-213.471	12.76	2.14889	208.3	-1.89243	-1.01805
82	-3.40311	-213.406	14.0667	2.1319	208.	-1.88165	-1.00219
83	-3.33987	-213.34	15.3733	2.11428	207.8	-1.86996	-.986619
84	-3.27663	-213.275	16.68	2.09616	207.6	-1.85748	-.971423
85	-3.2134	-213.209	17.9867	2.07784	207.4	-1.84445	-.956765
86	-3.15016	-213.143	19.2933	2.05988	207.2	-1.83134	-.943033
J10	-3.08692	-213.078	20.6	2.04507	207.1	-1.82025	-.932192
2J1	-4.02659	-205.961	1.	2.29569	212.6	-1.93473	-1.23572
88	-3.96287	-206.028	2.30667	2.28322	212.1	-1.93487	-1.21217
89	-3.89915	-206.096	3.61333	2.27102	211.6	-1.93363	-1.19106
90	-3.83543	-206.164	4.92	2.25856	211.2	-1.93102	-1.17143
91	-3.77171	-206.232	6.22667	2.24562	210.9	-1.92713	-1.15281
92	-3.70799	-206.3	7.53333	2.23204	210.6	-1.92197	-1.13492
93	-3.64427	-206.367	8.84	2.21777	210.3	-1.91559	-1.11758
94	-3.58055	-206.435	10.1467	2.20274	210.	-1.90804	-1.10066
95	-3.51683	-206.503	11.4533	2.18695	209.7	-1.89935	-1.08408
96	-3.45311	-206.571	12.76	2.17042	209.5	-1.88959	-1.0678
97	-3.38939	-206.638	14.0667	2.15318	209.2	-1.87881	-1.05178
98	-3.32568	-206.706	15.3733	2.13531	209.	-1.86712	-1.03605
99	-3.26196	-206.774	16.68	2.11698	208.8	-1.85466	-1.02071
100	-3.19824	-206.842	17.9867	2.09846	208.6	-1.84166	-1.0059
101	-3.13452	-206.91	19.2933	2.08034	208.5	-1.82858	-.992028
J11	-3.0708	-206.977	20.6	2.06542	208.4	-1.81754	-.981085
2J1	3.07078	-206.977	20.6	2.00169	208.	-1.76719	-.940105
103	3.00636	-207.038	21.9667	1.98523	207.9	-1.75463	-.928657
104	2.94194	-207.099	23.3333	1.96322	207.7	-1.73753	-.913893
105	2.87753	-207.16	24.7	1.93866	207.6	-1.71817	-.897934
106	2.81311	-207.221	26.0667	1.91217	207.4	-1.69702	-.88121
107	2.74869	-207.281	27.4333	1.88411	207.3	-1.67436	-.863943
108	2.68427	-207.342	28.8	1.85469	207.1	-1.65036	-.846279
109	2.61986	-207.403	30.1667	1.82405	207.	-1.62514	-.828312
110	2.55544	-207.464	31.5333	1.79233	206.9	-1.59881	-.810104
111	2.49102	-207.525	32.9	1.75966	206.7	-1.57149	-.791726
112	2.4266	-207.585	34.2667	1.72616	206.6	-1.54328	-.773249
113	2.36219	-207.646	35.6333	1.69202	206.5	-1.51436	-.754751
114	2.29777	-207.707	37.	1.65753	206.4	-1.48497	-.736381
115	2.23335	-207.768	38.3667	1.62317	206.3	-1.45554	-.718385
116	2.16893	-207.829	39.7333	1.58999	206.2	-1.42698	-.701271
J12	2.10452	-207.889	41.1	1.56275	206.1	-1.40343	-.687436
2J1	3.08691	-213.078	20.6	1.97418	206.8	-1.76176	-.89082
118	3.02178	-213.012	21.9667	1.95782	206.7	-1.74916	-.879492
119	2.95665	-212.946	23.3333	1.93592	206.5	-1.73199	-.864876
120	2.89153	-212.88	24.7	1.91148	206.4	-1.71256	-.849072
121	2.8264	-212.814	26.0667	1.88512	206.2	-1.69133	-.832512
122	2.76127	-212.748	27.4333	1.85717	206.	-1.66859	-.815421
123	2.69615	-212.682	28.8	1.82787	205.9	-1.6445	-.797935
124	2.63102	-212.617	30.1667	1.79735	205.7	-1.6192	-.780151

125	2.56589	-212.551	31.5333	1.76575	205.6	-1.5928	-.762134
126	2.50077	-212.485	32.9	1.73317	205.4	-1.56539	-.743947
127	2.43564	-212.419	34.2667	1.69978	205.3	-1.5371	-.725661
128	2.37051	-212.353	35.6333	1.66575	205.1	-1.5081	-.707368
129	2.30539	-212.287	37.	1.63136	205.	-1.47862	-.689207
130	2.24026	-212.221	38.3667	1.5971	204.9	-1.44912	-.671418
131	2.17513	-212.155	39.7333	1.56402	204.7	-1.42048	-.654512
J13	2.11001	-212.09	41.1	1.53686	204.6	-1.39687	-.640856
2J1	-3.08692	-213.078	20.6	1.97258	206.6	-1.76398	-.882865
133	-3.0218	-213.012	21.9667	1.95623	206.5	-1.75135	-.871558
134	-2.95667	-212.946	23.3333	1.93435	206.3	-1.73417	-.856971
135	-2.89154	-212.88	24.7	1.90992	206.1	-1.7147	-.841188
136	-2.82642	-212.814	26.0667	1.88357	206.	-1.69345	-.824663
137	-2.76129	-212.748	27.4333	1.85564	205.8	-1.67068	-.807601
138	-2.69616	-212.682	28.8	1.82634	205.6	-1.64657	-.790142
139	-2.63104	-212.617	30.1667	1.79582	205.5	-1.62123	-.772387
140	-2.56591	-212.551	31.5333	1.76423	205.3	-1.5948	-.754398
141	-2.50078	-212.485	32.9	1.73167	205.2	-1.56736	-.736247
142	-2.43566	-212.419	34.2667	1.69828	205.	-1.53904	-.717996
143	-2.37053	-212.353	35.6333	1.66426	204.9	-1.51001	-.699737
144	-2.3054	-212.287	37.	1.62987	204.7	-1.4805	-.681608
145	-2.24028	-212.221	38.3667	1.59562	204.6	-1.45096	-.663854
146	-2.17515	-212.155	39.7333	1.56253	204.5	-1.4223	-.646981
J14	-2.11002	-212.09	41.1	1.53537	204.4	-1.39865	-.633354
2J1	-3.0708	-206.977	20.6	2.00041	207.8	-1.7697	-.932631
148	-3.00638	-207.038	21.9667	1.98395	207.7	-1.75712	-.921197
149	-2.94196	-207.099	23.3333	1.96195	207.5	-1.74	-.906454
150	-2.87755	-207.16	24.7	1.9374	207.4	-1.72061	-.890516
151	-2.81313	-207.221	26.0667	1.91093	207.2	-1.69944	-.873821
152	-2.74871	-207.281	27.4333	1.88287	207.1	-1.67675	-.856582
153	-2.68429	-207.342	28.8	1.85345	206.9	-1.65271	-.838947
154	-2.61987	-207.403	30.1667	1.82282	206.8	-1.62746	-.821
155	-2.55546	-207.464	31.5333	1.79111	206.6	-1.60111	-.802821
156	-2.49104	-207.525	32.9	1.75844	206.5	-1.57376	-.784471
157	-2.42662	-207.585	34.2667	1.72494	206.4	-1.54552	-.766023
158	-2.3622	-207.646	35.6333	1.69081	206.2	-1.51657	-.74756
159	-2.29779	-207.707	37.	1.65631	206.1	-1.48715	-.729218
160	-2.23337	-207.768	38.3667	1.62196	206.	-1.45769	-.711257
161	-2.16895	-207.829	39.7333	1.58877	205.9	-1.4291	-.694169
J15	-2.10453	-207.889	41.1	1.56154	205.8	-1.40553	-.680361
2J1	2.10452	-207.889	41.1	1.48739	205.7	-1.34079	-.643883
163	2.04587	-207.946	42.3875	1.46194	205.6	-1.31865	-.631211
164	1.98722	-208.003	43.675	1.42893	205.5	-1.28981	-.614997
165	1.92857	-208.06	44.9625	1.39305	205.4	-1.25836	-.597595
166	1.86992	-208.116	46.25	1.35533	205.3	-1.22518	-.579512
167	1.81127	-208.173	47.5375	1.31627	205.2	-1.19073	-.561004
168	1.75263	-208.23	48.825	1.27618	205.1	-1.15526	-.542212
169	1.69398	-208.286	50.1125	1.23523	205.1	-1.11895	-.523221
170	1.63533	-208.343	51.4	1.19355	205.	-1.08188	-.50409
171	1.57668	-208.4	52.6875	1.15123	204.9	-1.04415	-.484857
172	1.51803	-208.457	53.975	1.10834	204.8	-1.00582	-.465556
173	1.45938	-208.513	55.2625	1.06498	204.8	-.96699	-.446222
174	1.40074	-208.57	56.55	1.02125	204.7	-.927738	-.426901
175	1.34209	-208.627	57.8375	.97733	204.7	-.888246	-.407668
176	1.28344	-208.683	59.125	.933646	204.6	-.848889	-.388694
177	1.22479	-208.74	60.4125	.89124	204.6	-.810613	-.370426
J16	1.16614	-208.797	61.7	.855417	204.5	-.778224	-.355113
2J1	2.11001	-212.09	41.1	1.46559	204.6	-1.33296	-.609242
179	2.04955	-212.034	42.3875	1.44022	204.5	-1.31077	-.596748
180	1.98909	-211.978	43.675	1.40729	204.4	-1.28188	-.58074
181	1.92863	-211.922	44.9625	1.3715	204.3	-1.25037	-.56355
182	1.86817	-211.866	46.25	1.33387	204.1	-1.21714	-.545683
183	1.80772	-211.811	47.5375	1.29492	204.	-1.18265	-.527393
184	1.74726	-211.755	48.825	1.25493	203.9	-1.14715	-.508821
185	1.6868	-211.699	50.1125	1.2141	203.8	-1.1108	-.490055
186	1.62634	-211.643	51.4	1.17254	203.7	-1.07371	-.471149
187	1.56588	-211.587	52.6875	1.13035	203.6	-1.03598	-.452145
188	1.50543	-211.532	53.975	1.08761	203.5	-.997671	-.433077
189	1.44497	-211.476	55.2625	1.04441	203.4	-.958858	-.413981
190	1.38451	-211.42	56.55	1.00085	203.2	-.919649	-.394901
191	1.32405	-211.364	57.8375	.957125	203.1	-.880213	-.375915
192	1.26359	-211.309	59.125	.913637	203.	-.840919	-.357193

193	1.20314	-211.253	60.4125	.871451	202.9	-.802736	-.339179
J17	1.14268	-211.197	61.7	.835843	202.8	-.770451	-.324099
2J1	-2.11002	-212.09	41.1	1.46482	204.4	-1.33443	-.604137
195	-2.04957	-212.034	42.3875	1.43944	204.3	-1.31222	-.591669
196	-1.98911	-211.978	43.675	1.40651	204.2	-1.28329	-.575693
197	-1.92865	-211.922	44.9625	1.37071	204.	-1.25176	-.558535
198	-1.86819	-211.866	46.25	1.33308	203.9	-1.2185	-.540701
199	-1.80773	-211.811	47.5375	1.29412	203.8	-1.18398	-.522442
200	-1.74728	-211.755	48.825	1.25413	203.7	-1.14845	-.503902
201	-1.68682	-211.699	50.1125	1.21329	203.6	-1.11207	-.485166
202	-1.62636	-211.643	51.4	1.17173	203.5	-1.07495	-.466291
203	-1.5659	-211.587	52.6875	1.12954	203.3	-1.03719	-.447317
204	-1.50544	-211.532	53.975	1.08679	203.2	-.998845	-.428279
205	-1.44499	-211.476	55.2625	1.04358	203.1	-.960003	-.409212
206	-1.38453	-211.42	56.55	1.00002	203.	-.920766	-.39016
207	-1.32407	-211.364	57.8375	.956294	202.8	-.881309	-.371203
208	-1.26361	-211.309	59.125	.912801	202.7	-.841987	-.35251
209	-1.20315	-211.253	60.4125	.870616	202.6	-.803782	-.334524
J18	-1.1427	-211.197	61.7	.835	202.5	-.77147	-.319467
2J1	-2.10453	-207.889	41.1	1.48606	205.4	-1.34186	-.638587
211	-2.04588	-207.946	42.3875	1.46061	205.4	-1.31969	-.625939
212	-1.98724	-208.003	43.675	1.4276	205.3	-1.29083	-.609756
213	-1.92859	-208.06	44.9625	1.39172	205.2	-1.25935	-.592384
214	-1.86994	-208.116	46.25	1.35399	205.1	-1.22614	-.574332
215	-1.81129	-208.173	47.5375	1.31493	205.	-1.19167	-.555854
216	-1.75264	-208.23	48.825	1.27484	204.9	-1.15618	-.537093
217	-1.694	-208.286	50.1125	1.23388	204.8	-1.11982	-.518133
218	-1.63535	-208.343	51.4	1.1922	204.7	-1.08273	-.499032
219	-1.5767	-208.4	52.6875	1.14987	204.7	-1.04497	-.479829
220	-1.51805	-208.457	53.975	1.10698	204.6	-1.00662	-.460558
221	-1.4594	-208.513	55.2625	1.06361	204.5	-.96776	-.441254
222	-1.40075	-208.57	56.55	1.01987	204.4	-.928481	-.421961
223	-1.34211	-208.627	57.8375	.975949	204.4	-.888967	-.402758
224	-1.28346	-208.683	59.125	.932256	204.3	-.849582	-.383813
225	-1.22481	-208.74	60.4125	.88984	204.3	-.811278	-.365573
J19	-1.16616	-208.797	61.7	.85401	204.2	-.778867	-.350284
2J1	1.16614	-208.797	61.7	.806246	203.9	-.737364	-.326079
227	1.13337	-208.83	62.41	.789825	203.8	-.722486	-.319119
228	1.10061	-208.864	63.12	.767974	203.8	-.702672	-.309896
229	1.06784	-208.897	63.83	.744466	203.8	-.681335	-.300018
230	1.03507	-208.931	64.54	.720038	203.7	-.659144	-.289799
231	1.0023	-208.964	65.25	.695052	203.7	-.636426	-.27939
232	.969532	-208.997	65.96	.669706	203.7	-.613361	-.268875
233	.936763	-209.031	66.67	.644109	203.6	-.590049	-.258298
234	.903995	-209.064	67.38	.618331	203.6	-.566553	-.247691
235	.871226	-209.098	68.09	.592414	203.6	-.542911	-.23707
236	.838458	-209.131	68.8	.566384	203.6	-.519147	-.226445
237	.805689	-209.165	69.51	.540261	203.5	-.49528	-.215824
238	.772921	-209.198	70.22	.514059	203.5	-.471322	-.205212
239	.740152	-209.231	70.93	.487788	203.5	-.447284	-.194614
240	.707384	-209.265	71.64	.461457	203.5	-.423172	-.184033
241	.674615	-209.298	72.35	.435074	203.5	-.398996	-.17347
242	.641847	-209.332	73.06	.408643	203.5	-.374757	-.162929
243	.609078	-209.365	73.77	.382168	203.5	-.350462	-.15241
244	.576309	-209.399	74.48	.355653	203.5	-.326113	-.141913
245	.543541	-209.432	75.19	.3291	203.5	-.301713	-.13144
246	.510772	-209.466	75.9	.302508	203.6	-.277259	-.12099
247	.478004	-209.499	76.61	.275873	203.6	-.25275	-.11056
248	.445235	-209.532	77.32	.249188	203.7	-.228178	-.100148
249	.412467	-209.566	78.03	.22244	203.8	-.203531	-.0897474
250	.379698	-209.599	78.74	.195606	203.9	-.178788	-.0793508
251	.34693	-209.633	79.45	.168647	204.1	-.153912	-.0689408
252	.314161	-209.666	80.16	.141497	204.4	-.128841	-.0584927
253	.281393	-209.7	80.87	.114033	204.9	-.103458	-.0479581
254	.248624	-209.733	81.58	.0860041	205.7	-.0775236	-.0372396
255	.215856	-209.767	82.29	.0567832	207.4	-.050434	-.0260912
J20	.183087	-209.8	83.	.0248665	213.9	-.0206274	-.0138872
2J1	1.14268	-211.197	61.7	.790237	203.2	-.726418	-.311114
257	1.1107	-211.164	62.41	.773916	203.2	-.711597	-.304264
258	1.07873	-211.13	63.12	.752172	203.1	-.691836	-.29517
259	1.04675	-211.097	63.83	.728781	203.1	-.670563	-.285426
260	1.01478	-211.064	64.54	.704476	203.	-.64844	-.275339

261	.982805	-211.031	65.25	.679615	203.	-.625794	-.265061
262	.95083	-210.998	65.96	.654395	202.9	-.602804	-.254675
263	.918855	-210.964	66.67	.628925	202.9	-.579569	-.244226
264	.88688	-210.931	67.38	.603276	202.8	-.556153	-.233743
265	.854906	-210.898	68.09	.577486	202.7	-.532591	-.223242
266	.822931	-210.865	68.8	.551585	202.7	-.50891	-.212735
267	.790956	-210.831	69.51	.525591	202.6	-.485128	-.202229
268	.758982	-210.798	70.22	.499517	202.6	-.461256	-.191729
269	.727007	-210.765	70.93	.473374	202.5	-.437304	-.181241
270	.695032	-210.732	71.64	.447171	202.5	-.413281	-.170764
271	.663057	-210.698	72.35	.420914	202.4	-.389193	-.160305
272	.631083	-210.665	73.06	.394609	202.3	-.365045	-.149861
273	.599108	-210.632	73.77	.36826	202.2	-.340841	-.139438
274	.567133	-210.599	74.48	.341869	202.2	-.316584	-.129033
275	.535158	-210.566	75.19	.315438	202.1	-.292273	-.118648
276	.503184	-210.532	75.9	.288966	202.	-.267911	-.108282
277	.471209	-210.499	76.61	.262448	201.9	-.243492	-.0979321
278	.439234	-210.466	77.32	.235879	201.8	-.219011	-.0875971
279	.407259	-210.433	78.03	.209242	201.7	-.194452	-.0772684
280	.375285	-210.399	78.74	.182513	201.5	-.169795	-.0669384
281	.34331	-210.366	79.45	.155653	201.3	-.145001	-.0565906
282	.311335	-210.333	80.16	.128592	201.1	-.120007	-.046198
283	.27936	-210.3	80.87	.101204	200.7	-.0946936	-.0357117
284	.247386	-210.266	81.58	.0732321	200.	-.0688204	-.0250336
285	.215411	-210.233	82.29	.0440312	198.4	-.0417752	-.0139134
J21	.183436	-210.2	83.	.0121031	188.2	-.0119787	-1.73E-03
2J1	-1.1427	-211.197	61.7	.789692	203.	-.727118	-.308079
287	-1.11072	-211.164	62.41	.773371	202.9	-.71229	-.301241
288	-1.07875	-211.13	63.12	.751621	202.9	-.692515	-.292161
289	-1.04677	-211.097	63.83	.728228	202.8	-.671229	-.28243
290	-1.0148	-211.064	64.54	.703918	202.8	-.649093	-.272358
291	-.982823	-211.031	65.25	.679054	202.7	-.626436	-.262093
292	-.950848	-210.998	65.96	.65383	202.6	-.603433	-.25172
293	-.918873	-210.964	66.67	.628358	202.6	-.580186	-.241285
294	-.886899	-210.931	67.38	.602705	202.5	-.556757	-.230814
295	-.854924	-210.898	68.09	.576914	202.5	-.533185	-.220326
296	-.822949	-210.865	68.8	.551009	202.4	-.509492	-.209831
297	-.790974	-210.831	69.51	.525013	202.3	-.485699	-.199337
298	-.759	-210.798	70.22	.498936	202.2	-.461816	-.188849
299	-.727025	-210.765	70.93	.472792	202.2	-.437853	-.178372
300	-.69505	-210.732	71.64	.446587	202.1	-.41382	-.167907
301	-.663075	-210.698	72.35	.420328	202.	-.389721	-.157457
302	-.631101	-210.665	73.06	.394021	201.9	-.365563	-.147025
303	-.599126	-210.632	73.77	.367671	201.8	-.341349	-.136612
304	-.567151	-210.599	74.48	.341279	201.7	-.317082	-.126217
305	-.535177	-210.566	75.19	.314848	201.6	-.292763	-.115842
306	-.503202	-210.532	75.9	.288377	201.5	-.268392	-.105485
307	-.471227	-210.499	76.61	.261861	201.3	-.243965	-.0951447
308	-.439252	-210.466	77.32	.235293	201.1	-.219474	-.0848182
309	-.407278	-210.433	78.03	.20866	200.9	-.194908	-.0744993
310	-.375303	-210.399	78.74	.181937	200.7	-.170242	-.0641776
311	-.343328	-210.366	79.45	.155086	200.3	-.145441	-.0538383
312	-.311353	-210.333	80.16	.128039	199.8	-.12044	-.0434539
313	-.279379	-210.3	80.87	.100673	199.1	-.0951193	-.0329758
314	-.247404	-210.266	81.58	.0727438	197.9	-.0692396	-.0223055
315	-.215429	-210.233	82.29	.0436481	194.9	-.0421889	-.0111917
J22	-.183454	-210.2	83.	.0124498	175.4	-.0124089	1.01E-03
2J1	-1.16616	-208.797	61.7	.805842	203.7	-.737746	-.324211
317	-1.13339	-208.83	62.41	.789426	203.7	-.722868	-.317262
318	-1.10062	-208.864	63.12	.767566	203.7	-.703037	-.308053
319	-1.06786	-208.897	63.83	.744054	203.6	-.681688	-.29819
320	-1.03509	-208.931	64.54	.719623	203.6	-.659486	-.287985
321	-1.00232	-208.964	65.25	.694635	203.6	-.636758	-.27759
322	-.96955	-208.997	65.96	.669285	203.5	-.613682	-.267088
323	-.936781	-209.031	66.67	.643686	203.5	-.590361	-.256526
324	-.904013	-209.064	67.38	.617906	203.5	-.566856	-.245932
325	-.871244	-209.098	68.09	.591985	203.4	-.543204	-.235322
326	-.838476	-209.131	68.8	.565953	203.4	-.519431	-.224709
327	-.805707	-209.165	69.51	.539827	203.4	-.495555	-.2141
328	-.772939	-209.198	70.22	.513623	203.3	-.471589	-.203499
329	-.74017	-209.231	70.93	.487349	203.3	-.447543	-.192911
330	-.707402	-209.265	71.64	.461015	203.3	-.423423	-.18234

331	-.674633	-209.298	72.35	.434629	203.3	-.399239	-.171788
332	-.641865	-209.332	73.06	.408195	203.3	-.374994	-.161256
333	-.609096	-209.365	73.77	.381718	203.3	-.350692	-.150745
334	-.576328	-209.399	74.48	.355201	203.3	-.326337	-.140257
335	-.543559	-209.432	75.19	.328644	203.3	-.30193	-.129791
336	-.510791	-209.466	75.9	.302049	203.3	-.277471	-.119348
337	-.478022	-209.499	76.61	.275411	203.3	-.252956	-.108925
338	-.445254	-209.532	77.32	.248723	203.3	-.228379	-.098519
339	-.412485	-209.566	78.03	.221971	203.4	-.203728	-.0881253
340	-.379716	-209.599	78.74	.195132	203.5	-.178981	-.0777336
341	-.346948	-209.633	79.45	.168168	203.6	-.154101	-.0673291
342	-.314179	-209.666	80.16	.141009	203.8	-.129026	-.0568853
343	-.281411	-209.7	80.87	.113533	204.1	-.103639	-.0463547
344	-.248642	-209.733	81.58	.0854866	204.6	-.0777032	-.0356395
345	-.215874	-209.767	82.29	.0562274	205.8	-.0506128	-.0244922
J23	-.183105	-209.8	83.	.0241641	210.5	-.0208177	-.012269
2J1	3.07078	-206.977	20.6	.0320356	227.6	-.0216091	-.0236501
347	3.07481	-208.502	20.6	.0161254	231.5	-.0100395	-.012619
348	3.07884	-210.027	20.6	4.32E-03	12.8	4.21E-03	9.54E-04
349	3.08287	-211.553	20.6	.0234786	38.1	.0184699	.0144951
2J2	3.08691	-213.078	20.6	.0393909	40.2	.0300653	.0254503
2J1	3.08691	-213.078	20.6	.0356556	223.8	-.0257313	-.0246824
352	1.54345	-213.078	20.6	.019466	224.3	-.0139354	-.0135915
353	-9.06E-06	-213.078	20.6	5.6E-04	4.8	5.58E-04	4.67E-05
354	-1.54347	-213.078	20.6	.0203429	42.3	.0150568	.0136794
2J2	-3.08692	-213.078	20.6	.0365318	42.7	.0268638	.0247569
2J1	-3.08692	-213.078	20.6	.0383188	219.9	-.029405	-.0245698
357	-3.08289	-211.553	20.6	.0224204	217.5	-.0177946	-.0136392
358	-3.07886	-210.027	20.6	3.51E-03	182.	-3.51E-03	-1.21E-04
359	-3.07483	-208.502	20.6	.0172091	51.3	.010764	.0134272
2J2	-3.0708	-206.977	20.6	.0331263	47.6	.0223573	.0244439
2J1	-3.0708	-206.977	20.6	.0350128	223.3	-.0254841	-.0240096
362	-1.5354	-206.977	20.6	.0188855	223.	-.0138085	-.0128836
363	-8.82E-06	-206.977	20.6	9.83E-04	56.6	5.42E-04	8.2E-04
364	1.53539	-206.977	20.6	.0208009	44.3	.0148869	.0145278
2J2	3.07078	-206.977	20.6	.0369271	44.	.0265507	.0256646
2J1	2.10452	-207.889	41.1	.0394716	217.7	-.0312106	-.0241642
367	2.10635	-209.289	41.1	.0170703	228.1	-.0113971	-.0127083
368	2.10818	-210.689	41.1	.0124211	4.5	.0123821	9.84E-04
2J2	2.11001	-212.09	41.1	.0345082	21.	.0322211	.0123537
2J1	2.11001	-212.09	41.1	.0370818	211.3	-.0316876	-.0192602
371	.703329	-212.09	41.1	.0141237	213.9	-.0117179	-7.88E-03
372	-.703348	-212.09	41.1	.0135097	25.2	.0122277	5.74E-03
2J2	-2.11002	-212.09	41.1	.0364702	28.	.0322098	.0171057
2J1	-2.11002	-212.09	41.1	.0342275	200.7	-.032013	-.0121115
375	-2.10819	-210.689	41.1	.0121743	183.6	-.01215	-7.68E-04
376	-2.10636	-209.289	41.1	.0173823	47.9	.0116576	.0128937
2J2	-2.10453	-207.889	41.1	.0397942	37.7	.0314945	.0243243
2J1	-2.10453	-207.889	41.1	.0365966	208.5	-.0321685	-.01745
379	-.701517	-207.889	41.1	.0136433	205.8	-.0122822	-5.94E-03
380	.701499	-207.889	41.1	.0139783	34.2	.0115546	7.87E-03
2J2	2.10452	-207.889	41.1	.0369283	31.7	.0314288	.0193889
2J1	1.16614	-208.797	61.7	.0281742	222.7	-.020698	-.0191149
383	1.15832	-209.597	61.7	.0147944	240.3	-7.33E-03	-.0128501
384	1.1505	-210.397	61.7	.0107942	332.8	9.6E-03	-4.94E-03
2J2	1.14268	-211.197	61.7	.0229977	3.2	.0229619	1.28E-03
2J1	1.14268	-211.197	61.7	.0241022	209.	-.0210711	-.0117016
387	.380887	-211.197	61.7	.0104483	214.6	-8.61E-03	-5.93E-03
388	-.380905	-211.197	61.7	7.55E-03	11.4	7.4E-03	1.49E-03
2J2	-1.1427	-211.197	61.7	.0211575	20.1	.019873	7.26E-03
2J1	-1.1427	-211.197	61.7	.024825	189.6	-.0244795	-4.13E-03
391	-1.15052	-210.397	61.7	.0112984	169.4	-.0111046	2.08E-03
392	-1.15834	-209.597	61.7	.0115637	59.7	5.84E-03	9.98E-03
2J2	-1.16616	-208.797	61.7	.0251495	40.2	.0192104	.0162314
2J1	-1.16616	-208.797	61.7	.0240203	204.2	-.0219113	-9.84E-03
395	-.388726	-208.797	61.7	9.84E-03	202.8	-9.07E-03	-3.82E-03
396	.388708	-208.797	61.7	8.3E-03	27.9	7.33E-03	3.89E-03
2J2	1.16614	-208.797	61.7	.0224699	26.2	.0201623	9.92E-03
2J1	.183087	-209.8	83.	.0544539	148.8	-.0465848	.0281972
2J2	.183087	-210.2	83.	.0458189	129.7	-.0292587	.0352604
2J1	.183436	-210.2	83.	.0531487	140.9	-.0412374	.0335299
2J2	-.183454	-210.2	83.	.0474348	122.7	-.0256391	.0399086

2J1	-.183454	-210.2	83.	.0558728	132.9	-.038048	.0409159
2J2	-.183454	-209.8	83.	.0522816	113.4	-.0207237	.0479989
2J1	-.183105	-209.8	83.	.0547934	139.3	-.0415415	.0357299
2J2	.183087	-209.8	83.	.0494457	121.7	-.0259574	.0420843
GND	0	0	0	8.23394	256.1	-1.98104	-7.99207
407	0	0	8.04167	8.74021	254.3	-2.3623	-8.41492
408	0	0	16.0833	8.89	253.3	-2.55251	-8.51569
409	0	0	24.125	8.81455	252.5	-2.64341	-8.40884
410	0	0	32.1667	8.53302	251.9	-2.64681	-8.11214
411	0	0	40.2083	8.05748	251.4	-2.56857	-7.63711
412	0	0	48.25	7.39927	251.	-2.41315	-6.99471
413	0	0	56.2917	6.57032	250.6	-2.18488	-6.1964
414	0	0	64.3333	5.58319	250.2	-1.88825	-5.25419
415	0	0	72.375	4.44974	249.9	-1.52753	-4.17933
416	0	0	80.4167	3.17734	249.6	-1.10545	-2.97884
417	0	0	88.4583	1.75772	249.4	-.619125	-1.64507
END	0	0	96.5	0	0	0	0

FIGURE 8
DERIVED DIRECTIONAL PARAMETERS

APPLICATION FOR LICENSE INFORMATION
EMPLOYING MOMENT METHOD MODELING
KTRS, 550 KHZ, DA-N
ST. LOUIS, MISSOURI
OCTOBER, 2021

NIGHT:

	Theoretical		Base Network Input Current		Normalized TCT	
Tower	Field	Phase	Amplitude	Phase	Amplitude	Phase
1 (WC)	1.000	0.0°	7.41	-1.95°	.902	101.9°
2 (E)	.750	-45.0°	5.79	-42.35°	.704	61.5°
3 (EC)	.893	-153.0°	9.34	-145.24°	1.136	-41.4°
4 (W)	1.190	-108.0°	8.22	-103.84°	1.000	0.0°

FIGURE 9
TOWER BASE CIRCUIT ANALYSIS DESCRIPTION

APPLICATION FOR LICENSE INFORMATION
EMPLOYING MOMENT METHOD MODELING
KTRS, 550 KHZ, DA-N
ST. LOUIS, MISSOURI
OCTOBER, 2021

CIRCUIT ANALYSIS

Circuit Analysis was performed on each Tower of the KTRS model. "Phasetek" nodal Circuit Analysis program was used to compute base model Input/Output voltages and currents. For the Directional modes, the calculated Mininec Tower Base Drive Voltage was used to determine the Base Network Input Current. This point is the location of the Sampling TCT. "Z_1" represents the ATU Shunt impedance, "Z_2" represents the Tower Feed impedance, and "Z_3" represents the Tower Base Shunt impedance.

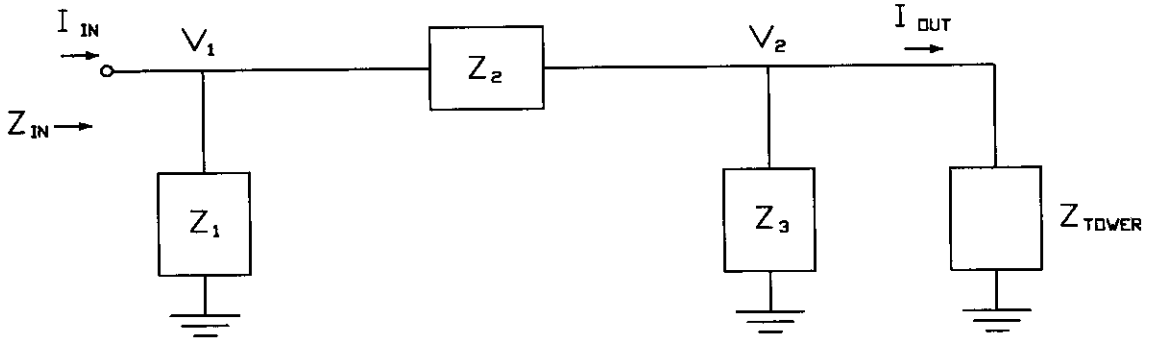

FIGURE 10
KTRS CIRCUIT ANALYSIS FOR INDIVIDUAL TOWERS

CUSTOMER : KTRS
NETWORK ID : TOWER 1 (OTHERS OPEN)

FREQUENCY : 550.00 kHz
ATU SHUNT IMPEDANCE (R,X) : 0.00,100000.00 OHMS
TOWER FEED IMPEDANCE (R,X) : 0.00, 18.20 OHMS
TOWER SHUNT IMPEDANCE (R,X) : 0.00,-28937.30 OHMS
TOWER IMPEDANCE (R,X) : 50.71, 54.72 OHMS

NODE	TO	NODE	IMPEDANCE (OHMS) R	X
1		GROUND	0.00	100000.00
2		GROUND	50.90	54.73
1		2	0.00	18.20

NODE	VOLTAGE MAGNITUDE	PHASE
1	100.00	0.00
2	84.04	-8.01

	REAL	IMAGINARY	MAGNITUDE	PHASE
INPUT IMPEDANCE (OHMS) :	50.83	72.91	88.88	55.12
INPUT CURRENT (AMPS) :	0.64	-0.92	1.13	-55.12
OUTPUT CURRENT (AMPS) :	0.64	-0.92	1.13	-55.19

INPUT/OUTPUT CURRENT RATIO = 0.9988
INPUT/OUTPUT PHASE = 0.07 DEGREES

CUSTOMER : KTRS
NETWORK ID : TOWER 2 (OTHERS OPEN)

FREQUENCY : 550.00 kHz
ATU SHUNT IMPEDANCE (R,X) : 0.00,100000.00 OHMS
TOWER FEED IMPEDANCE (R,X) : 0.00, 22.40 OHMS
TOWER SHUNT IMPEDANCE (R,X) : 0.00,-28937.30 OHMS
TOWER IMPEDANCE (R,X) : 51.07, 53.68 OHMS

NODE	TO	NODE	IMPEDANCE (OHMS) R	X
1		GROUND	0.00	100000.00
2		GROUND	51.26	53.69
1		2	0.00	22.40

NODE	VOLTAGE MAGNITUDE	PHASE
1	100.00	0.00
2	80.91	-9.71

	REAL	IMAGINARY	MAGNITUDE	PHASE
INPUT IMPEDANCE (OHMS) :	51.18	76.06	91.68	56.06
INPUT CURRENT (AMPS) :	0.61	-0.90	1.09	-56.06
OUTPUT CURRENT (AMPS) :	0.61	-0.91	1.09	-56.13

INPUT/OUTPUT CURRENT RATIO = 0.9989
INPUT/OUTPUT PHASE = 0.07 DEGREES

CUSTOMER : KTRS
NETWORK ID : TOWER 3 (OTHERS OPEN)

FREQUENCY : 550.00 kHz
ATU SHUNT IMPEDANCE (R,X) : 0.00,100000.00 OHMS
TOWER FEED IMPEDANCE (R,X) : 0.00, 20.00 OHMS
TOWER SHUNT IMPEDANCE (R,X) : 0.00, -7234.30 OHMS
TOWER IMPEDANCE (R,X) : 22.28, -24.55 OHMS

NODE	TO	NODE	IMPEDANCE (OHMS) R	X
1		GROUND	0.00	100000.00
2		GROUND	22.13	-24.53
1		2	0.00	20.00

NODE	VOLTAGE MAGNITUDE	PHASE
1	100.00	0.00
2	146.27	-36.37

	REAL	IMAGINARY	MAGNITUDE	PHASE
INPUT IMPEDANCE (OHMS) :	22.13	-4.53	22.59	-11.57
INPUT CURRENT (AMPS) :	4.34	0.89	4.43	11.57
OUTPUT CURRENT (AMPS) :	4.32	0.87	4.41	11.41

INPUT/OUTPUT CURRENT RATIO = 1.0034
INPUT/OUTPUT PHASE = 0.16 DEGREES

CUSTOMER : KTRS
NETWORK ID : TOWER 4 (OTHERS OPEN)

FREQUENCY : 550.00 kHz
ATU SHUNT IMPEDANCE (R,X) : 0.00,100000.00 OHMS
TOWER FEED IMPEDANCE (R,X) : 0.00, 18.50 OHMS
TOWER SHUNT IMPEDANCE (R,X) : 0.00,-28937.30 OHMS
TOWER IMPEDANCE (R,X) : 51.71, 53.57 OHMS

NODE	TO	NODE	IMPEDANCE (OHMS) R	X
1		GROUND	0.00	100000.00
2		GROUND	51.90	53.58
1		2	0.00	18.50

NODE	VOLTAGE MAGNITUDE	PHASE
1	100.00	0.00
2	83.98	-8.33

	REAL	IMAGINARY	MAGNITUDE	PHASE
INPUT IMPEDANCE (OHMS) :	51.83	72.05	88.76	54.27
INPUT CURRENT (AMPS) :	0.66	-0.91	1.13	-54.27
OUTPUT CURRENT (AMPS) :	0.66	-0.92	1.13	-54.35

INPUT/OUTPUT CURRENT RATIO = 0.9989
INPUT/OUTPUT PHASE = 0.07 DEGREES

FIGURE 11
KTRS CIRCUIT ANALYSIS FOR DIRECTIONAL NIGHT MODE

CUSTOMER : KTRS
NETWORK ID : TOWER 1 NIGHT

FREQUENCY : 550.00 kHz
ATU SHUNT IMPEDANCE (R,X) : 0.00,100000.00 OHMS
TOWER FEED IMPEDANCE (R,X) : 0.00, 18.20 OHMS
TOWER SHUNT IMPEDANCE (R,X) : 0.00,-28937.30 OHMS
TOWER IMPEDANCE (R,X) : -18.91, 49.47 OHMS

NODE	TO	NODE	IMPEDANCE (OHMS) R	X
1		GROUND	0.00	100000.00
2		GROUND	-18.97	49.54
1		2	0.00	18.20

NODE	VOLTAGE MAGNITUDE	PHASE
1	521.06	103.69
2	392.94	109.00

	REAL	IMAGINARY	MAGNITUDE	PHASE
INPUT IMPEDANCE (OHMS) :	-18.95	67.70	70.30	105.64
INPUT CURRENT (AMPS) :	7.41	-0.25	7.41	-1.95
OUTPUT CURRENT (AMPS) :	7.42	-0.25	7.42	-1.92

INPUT/OUTPUT CURRENT RATIO = 0.9990
INPUT/OUTPUT PHASE = -0.03 DEGREES

CUSTOMER : KTRS
NETWORK ID : TOWER 2 NIGHT

FREQUENCY : 550.00 kHz
ATU SHUNT IMPEDANCE (R,X) : 0.00,100000.00 OHMS
TOWER FEED IMPEDANCE (R,X) : 0.00, 22.40 OHMS
TOWER SHUNT IMPEDANCE (R,X) : 0.00,-28937.30 OHMS
TOWER IMPEDANCE (R,X) : 21.41, 28.81 OHMS

NODE	TO	NODE	IMPEDANCE (OHMS) R	X
1		GROUND	0.00	100000.00
2		GROUND	21.45	28.82
1		2	0.00	22.40

NODE	VOLTAGE MAGNITUDE	PHASE
1	321.32	24.94
2	207.89	11.00

	REAL	IMAGINARY	MAGNITUDE	PHASE
INPUT IMPEDANCE (OHMS) :	21.43	51.20	55.51	67.29
INPUT CURRENT (AMPS) :	4.28	-3.90	5.79	-42.35
OUTPUT CURRENT (AMPS) :	4.28	-3.90	5.79	-42.38

INPUT/OUTPUT CURRENT RATIO = 0.9995
INPUT/OUTPUT PHASE = 0.03 DEGREES

CUSTOMER : KTRS
NETWORK ID : TOWER 3 NIGHT

FREQUENCY : 550.00 kHz
ATU SHUNT IMPEDANCE (R,X) : 0.00,100000.00 OHMS
TOWER FEED IMPEDANCE (R,X) : 0.00, 20.00 OHMS
TOWER SHUNT IMPEDANCE (R,X) : 0.00, -7234.30 OHMS
TOWER IMPEDANCE (R,X) : 29.49, -8.93 OHMS

NODE	TO NODE	IMPEDANCE (OHMS) R	X
1	GROUND	0.00	100000.00
2	GROUND	29.42	-9.04
1	2	0.00	20.00

NODE	VOLTAGE MAGNITUDE	PHASE
1	293.24	-124.78
2	287.46	197.70

	REAL	IMAGINARY	MAGNITUDE	PHASE
INPUT IMPEDANCE (OHMS) :	29.41	10.97	31.39	20.45
INPUT CURRENT (AMPS) :	-7.67	-5.33	9.34	-145.24
OUTPUT CURRENT (AMPS) :	-7.68	-5.29	9.33	-145.45

INPUT/OUTPUT CURRENT RATIO = 1.0014
INPUT/OUTPUT PHASE = 0.22 DEGREES

CUSTOMER : KTRS
NETWORK ID : TOWER 4 NIGHT

FREQUENCY : 550.00 kHz
ATU SHUNT IMPEDANCE (R,X) : 0.00,100000.00 OHMS
TOWER FEED IMPEDANCE (R,X) : 0.00, 18.50 OHMS
TOWER SHUNT IMPEDANCE (R,X) : 0.00,-28937.30 OHMS
TOWER IMPEDANCE (R,X) : 40.65, 86.00 OHMS

NODE	TO NODE	IMPEDANCE (OHMS) R	X
1	GROUND	0.00	100000.00
2	GROUND	40.89	86.20
1	2	0.00	18.50

NODE	VOLTAGE MAGNITUDE	PHASE
1	922.76	-35.15
2	783.24	320.80

	REAL	IMAGINARY	MAGNITUDE	PHASE
INPUT IMPEDANCE (OHMS) :	40.81	104.61	112.28	68.69
INPUT CURRENT (AMPS) :	-1.97	-7.98	8.22	-103.84
OUTPUT CURRENT (AMPS) :	-1.98	-7.99	8.23	-103.90

INPUT/OUTPUT CURRENT RATIO = 0.9981
INPUT/OUTPUT PHASE = 0.06 DEGREES

FIGURE 12
KTRS REFERENCE FIELD INTENSITY MEASUREMENTS
OCTOBER, 2021

KTRS NIGHT REFERENCE POINT MEASUREMENTS – OCTOBER 26, 2021

						CO-ORD NAD27			
Radial		**Dist km**	**mV/m**	**Time**		**Deg**	**Min**	**Sec**	**Description**
64.5°	1	5.93	7.49	1642	N	38	41	07.3	#2910 Route 111
					W	90	04	00.7	
	2	6.04	9.14	1645	N	38	41	09.3	Theikler Rd. opposite fence
					W	90	03	56.7	
	3	6.95	14.4	1653	N	38	41	22.0	Bruns Rd.
					W	90	03	22.5	
83°	1	3.38	10.7	1626	N	38	39	57.9	Route 111, South side
					W	90	05	23.9	
	2	3.42	10.3	1635	N	38	39	57.6	Route 111, North side
					W	90	05	22.2	
	3	6.93	15.2	1617	N	38	40	06.4	On ramp, I 55
					W	90	02	56.5	
124.5°	1	2.50	28.3	1554	N	38	38	58.9	43rd Street, parking lot
					W	90	06	17.7	
	2	2.60	22.7	1559	N	38	38	57.0	#2834 44th Street
					W	90	06	14.5	
	3	2.70	20.2	1603	N	38	38	55.3	#2821 45th Street
					W	90	06	10.8	

KTRS NIGHT REFERENCE POINT MEASUREMENTS – OCTOBER 26, 2021

					CO-ORD NAD27				
Radial		**Dist km**	**mV/m**	**Time**		**Deg**	**Min**	**Sec**	**Description**
184.5°	1	1.58	490	1537	N	38	38	54.1	End of Madison Rd.
					W	90	07	48.4	
	2	1.74	477	1543	N	38	38	48.6	On ramp I55/I70
					W	90	07	48.6	
	3	2.55	302	1548	N	38	38	22.5	Collinsville Rd. opposite fence
					W	90	07	51.2	
220°	1	0.37	1270	1530	N	38	39	35.7	Madison Rd. at drive
					W	90	07	52.7	
	2	3.39	68.2	1140	N	38	38	20.6	Route 3 at fire hydrant
					W	90	09	13.1	
	3	4.71	42.8	1155	N	38	37	46.8	Stone access road at railroad tracks
					W	90	09	46.7	
270°	1	0.97	1220	1056	N	38	39	45.0	Old Madison Rd.
					W	90	08	23.3	
	2	1.52	548	1115	N	38	39	45.0	Bend Rd..
					W	90	08	46.0	
	3	3.58	237	1131	N	38	39	45.0	4th Street at bridge
					W	90	10	10.0	

KTRS NIGHT REFERENCE POINT MEASUREMENTS – OCTOBER 26, 2021

					CO-ORD NAD27				
Radial		**Dist km**	**mV/m**	**Time**		**Deg**	**Min**	**Sec**	**Description**
320°	1	2.40	110	1103	N W	38 90	40 08	44.5 46.7	Intersection of 3rd St./McNair
	2	2.68	94.2	1106	N W	38 90	40 08	51.6 54.7	#1830 5th Street
	3	2.91	63.4	1109	N W	38 90	40 09	57.3 00.2	Intersection Highland/Skeen
358°	1	3.70	213	1708	N W	38 90	41 07	44.7 48.3	Route 203 at Iron mill
	2	5.25	289	1718	N W	38 90	42 07	35.2 49.3	Intersection Washington Ave./27th St.
	3	5.51	185	1725	N W	38 90	42 07	43.1 49.6	Opposite #2725 Madison Ave

FIGURE 13
KTRS DIRECTIONAL NIGHT CURRENT MOMENTS
OCTOBER, 2021

CURRENT MOMENTS(amp-degrees) rms

Frequency = .55 MHz
Input power = 5,000. watts

wire	magnitude	phase (deg)	vertical current moment magnitude	phase (deg)
1	1,100.56	360.	1,100.56	360.
2	825.417	315.	825.417	315.
3	19.9795	214.6	19.9795	34.6
4	27.395	214.3	2.51248	215.1
5	27.1752	213.2	2.48295	214.
6	27.1454	213.	2.4801	213.8
7	27.3618	214.	2.50933	214.9
8	92.7809	210.4	89.0499	210.3
9	91.8251	209.3	88.1308	209.2
10	91.7455	209.	88.0549	208.9
11	92.6851	210.2	88.9584	210.1
12	79.649	207.1	79.481	207.1
13	78.4887	205.8	78.3087	205.8
14	78.4213	205.5	78.2415	205.5
15	79.5945	206.8	79.4266	206.8
16	53.43	205.1	53.3228	205.1
17	52.5024	203.8	52.395	203.8
18	52.4664	203.6	52.3591	203.6
19	53.3698	204.9	53.2628	204.9
20	20.8264	203.7	20.7815	203.7
21	20.1626	202.6	20.1202	202.6
22	20.1352	202.2	20.093	202.2
23	20.8058	203.5	20.7609	203.5
24	.0685414	12.4	.0997229	223.5
25	9.04E-03	4.3	.100985	223.2
26	.0558292	181.5	.0997286	223.4
27	.0156933	56.9	.100642	223.7
28	.0704191	274.9	.107098	209.9
29	.0132187	283.5	.107579	209.6
30	.0726257	92.4	.107134	209.8
31	.0123469	110.8	.107543	210.1
32	.070951	277.2	.0664283	205.
33	.0176046	254.9	.0621989	204.8
34	.0520966	113.5	.066443	205.
35	6.78E-03	177.6	.0640758	205.2
36	.117684	140.1	.0142232	202.2
37	.114681	132.3	.0128105	202.2
38	.126839	123.5	.0142275	202.2
39	.118862	130.9	.0127935	202.2
40	1,309.66	252.	1,309.66	252.

Medium wave array vertical current moment (amps-degrees) rms
(Calculation assumes tower wires are grouped together.
The first wire of each group must contain the source.)

tower	magnitude	phase (deg)
1	1,100.56	360.
2	825.417	315.
3	953.094	206.8
4	1,309.66	252.