Akin Gump
STRAUSS HAUER & FELD LLP

STEVEN A. ROWINGS
+1 202.887.4412/fax: +1 202.887.4288
srowings@akingump.com

November 30, 2022

VIA E-MAIL (audiofilings@fcc.gov)

Marlene H. Dortch
Secretary
Federal Communications Commission
45 L Street NE
Washington, DC 20554

Re: ABC Radio Los Angeles Assets, LLC
AM Station KRDC, Facility ID No. 25076, Pasadena, CA
Application for Direct Measurement (Form 302-AM)

Dear Ms. Dortch:

ABC Radio Los Angeles Assets, LLC, licensee of AM Station KRDC, Facility ID No. 25076, Pasadena, CA, by its attorneys, hereby submits the enclosed FCC Form 302-AM application for authority to return to direct measurement of power.

This application is fee-exempt.

Should you have any questions or require additional information, please contact the undersigned.

Respectfully submitted,

Steven A. Rowings
Counsel to ABC Radio Los Angeles Assets, LLC

Enclosure

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)

ABC Radio Los Angeles Assets, LLC

MAILING ADDRESS (Line 1) (Maximum 35 characters)
77 W 66th St, 16th Floor

MAILING ADDRESS (Line 2) (Maximum 35 characters)

CITY	STATE OR COUNTRY (if foreign address)	ZIP CODE
New York	NY	10023

TELEPHONE NUMBER (include area code)	CALL LETTERS	OTHER FCC IDENTIFIER (If applicable)
212-456-7387	KRDC	25076

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
	0 0 0 1	$	

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
	0 0 0 1	$	

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
$	

SECTION II - APPLICANT INFORMATION

1. NAME OF APPLICANT
ABC Radio Los Angeles Assets, LLC

MAILING ADDRESS
77 W 66th St, 16th Floor

CITY	STATE	ZIP CODE
New York	NY	10023

2. This application is for:

- [x] Commercial
- [ ] Noncommercial
- [x] 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
KRDC	Pasadena, CA	N/A	N/A	N/A

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

If No, explain in an Exhibit.

[ ] Yes [x] No — Exhibit No. 1

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

If No, state exceptions in an Exhibit.

[ ] Yes [x] No — Exhibit No. 1

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?

If Yes, explain in an Exhibit.

[ ] Yes [x] No — 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)?

If No, explain in an Exhibit.

[x] Yes [ ] No
[ ] Does not apply
Exhibit No.

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

[ ] Yes [x] 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	
John W. Zucker	John W. Zucker Digitally signed by: John W. Zucker DN: CN = John W. Zucker email = John.W.Zucker@abc.com C = US O = ABC Radio Los Angeles Assets, LLC Date: 2022.11.30 16:37:14 -05'00'	
Title	**Date**	**Telephone Number**
Assistant Secretary	11/30/2022	212-456-7387

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.

EXHIBIT 1

Responses to FCC Form 302-AM, Section II, Items 3 and 4

The station is not operating pursuant to program test authority, but instead is operating pursuant to the terms of its license. The purpose of this application is to enable the station to return to direct measurement of power following the collocation of AM Station KSPN (Facility ID No. 33255) transmission facilities and diplexing onto the KRDC towers (*see* File No. BP-20200914AAV).

ENGINEERING EXHIBIT
IN SUPPORT OF AN
APPLICATION TO RETURN TO DIRECT MEASUREMENT OF POWER
KRDC(AM) – PASADENA, CALIFORNIA
1110 kHz – 50.0 kW DAY, 20.0 kW NIGHT, DA-2, U
FACILITY ID: 25076

Licensee: ABC Radio Los Angeles Assets, LLC

Consulting Engineers
CTJC
CARL T. JONES CORPORATION

TABLE OF CONTENTS

FCC Form 302-AM, Section III

ENGINEERING STATEMENT OF CARL T. JONES, JR., P.E.

SECTION III - LICENSE APPLICATION ENGINEERING DATA

Name of Applicant
ABC Radio Los Angeles Assets, LLC

PURPOSE OF AUTHORIZATION APPLIED FOR: (check one)

☐ Station License ☑ Direct Measurement of Power

1. Facilities authorized in construction permit

Call Sign	File No. of Construction Permit (if applicable)	Frequency (kHz)	Hours of Operation	Power in kilowatts Night	Power in kilowatts Day
KRDC	N/A	1110	Unlimited	20.0	50.0

2. Station location

State	City or Town
California	Pasadena

3. Transmitter location

State	County	City or Town	Street address (or other identification)
CA	Los Angeles	Irwindale	277 Longden Avenue

4. Main studio location

State	County	City or Town	Street address (or other identification)
CA	Los Angeles	Burbank	800 W Olympic Blvd., Ste A

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

State	County	City or Town	Street address (or other identification)
CA	Los Angeles	Burbank	800 W Olympic Blvd., Ste. A

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. Sttmt

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
20.52	32.45

Measured antenna or common point resistance (in ohms) at operating frequency Night	Day	Measured antenna or common point reactance (in ohms) at operating frequency Night	Day
50.0	50.0	-j14.0	-j14.0

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 (Northeast)	0.375		-147.1			
2 (East Center)	1.036		+107.0			
3 (West Center)	1.000		0.0			
4 (Southwest)	0.344	-50.3	-107.2	0.685		
5 (North)		0.0		1.000		

Manufacturer and type of antenna monitor: Potomac Instruments Model 1901-5, Serial No. 772

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.
steel, uniform cross-section, guyed	99.0 (All)	99.6 (All)	100.5 (All)	Exhibit No. N/A

Excitation ☑ Series ☐ Shunt

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

North Latitude	34 °	06 '	50 "	West Longitude	117 °	59 '	51 "

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. Sttmt

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

Exhibit No. N/A

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

N/A

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

No Change

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) Carl T. Jones, Jr.	Signature [illegible] below)
Address (include ZIP Code) Carl T. Jones Corporation 7901 Yarnwood Court Springfield, VA 22153	Date July 28, 2022 Telephone No. (Include Area Code) (703) 569-7704

☐ Technical Director ☑ Registered Professional Engineer

☐ Chief Operator ☐ Technical Consultant

☐ Other (specify)

ENGINEERING STATEMENT OF CARL T. JONES, JR., P.E.
IN SUPPORT OF AN
APPLICATION TO RETURN TO DIRECT MEASUREMENT OF POWER
KRDC(AM) – PASADENA, CALIFORNIA
1110 kHz – 50.0 kW DAY, 20.0 kW NIGHT, DA-2, U
FACILITY ID: 25076

Licensee: ABC Radio Los Angeles Assets, LLC

I am a Consulting Engineer and president of Carl T. Jones Corporation, with offices located in Springfield, Virginia. My education and experience are a matter of record with the Federal Communications Commission. I am a Registered Professional Engineer in the Commonwealth of Virginia, Registration No. 013391.

1.0 GENERAL

This office has been authorized by ABC Radio Los Angeles Assets, LLC ("ABC Radio LA"), licensee of AM Station KRDC, to prepare this engineering statement, FCC Form 302-AM and the associated figures and appendices in support of an Application to Return to Direct Measurement of Power. Station KRDC operates on 1110 kilohertz with a power of 50 kilowatts during daytime hours and 20 kilowatts during nighttime hours. The station is licensed pursuant to a proof of performance using moment method modeling and internal array parameters (Section 47 CFR 73.151(c)).

AM Station KSPN (Facility ID: 33255) was granted a construction permit (FCC File No. BP-20200914AAV) which authorizes collocation of its transmission facilities at the KRDC transmitter site and diplexing onto the KRDC towers. The KSPN construction permit specifies operation on 710 kHz with a daytime power of 34 kW and a nighttime power of 2.5 kW using different directional patterns for day and night operation. The KSPN construction permit specifies use of KRDC towers #1, #3 and #5 for the KSPN daytime directional operation and KRDC towers #2, #3 and #5 for the KSPN nighttime directional operation. KSPN will use KRDC tower #4 for emergency non-directional operation.

Following the installation of the new diplexing filters and the KSPN phasing and coupling systems, impedance measurements were performed at the output of each of the five KRDC ATU networks with the other towers open circuited at the corresponding ATU output locations. Based on these measurements, it was determined that it would be necessary to modify the previous moment method model and file FCC Form 302-AM.

The specific measurement and modeling techniques used in performing the KRDC pattern verifications are described in detail in this engineering statement. Impedance measurement data and model derived operating parameters are tabulated in the figures attached to this engineering statement. In accordance with the Rules, sampling system measurements, and reference field strength measurements have not been repeated. Although, out of an abundance of caution, the sample line impedances with the tower mounted loops attached were repeated and compared to the impedance measurements performed in the previous application for license. This comparison demonstrated that there has been no material change in the impedances of each sample line since the last measurement in 2018. All pertinent modified computer model input and output files are contained in the attached Appendices A, B, C and D

2.0 IMPEDANCE MEASUREMENTS, COMPUTER MODELING AND SAMPLE SYSTEM VERIFICATION

The pattern verification proof of performance contained herein is based on the computer modeling and sample system verification procedures described in Section 47 CFR 73.151(c) of the FCC's Rules and Regulations. The KRDC antenna array consists of five, triangular, uniform cross-section, guyed towers. All five towers have an electrical height of 132 degrees and a face width of approximately 31 inches.

The tower number at the KRDC site is different than that in the FCC's data base. The tower numbering scheme at the site is described in detail in the KRDC 2018 License Application (FCC File Number BMML-20170711ACG). The tower numbering in this application and on FCC Form 302-AM correspond to the numbering scheme at the site and not that in the FCC's data base. The ASR numbers for the site tower numbering are as follows: Tower #1 – 1012884; Tower #2 – 1012885; Tower #3 – 1012886; Tower #4 – 1012887; and Tower #5 – 1012888.

The sampling system employs identical, single turn, loops mounted in an identical manner on each tower. Sample isolation inductors are used at the base of each tower to allow the coaxial cable from the sample loop to cross the base insulator. A variable vacuum capacitor is installed in parallel with the sample isolation inductor and, prior to performing the impedance measurements, this capacitor was adjusted to achieve parallel resonance at the KRDC frequency of 1110 kHz. A detailed description of the tower base impedance measurements and the computer models employed is contained below.

2.1 BASE IMPEDANCE MEASUREMENTS

An impedance measurement was performed, by the undersigned, at the output J-Plug of each of the five KRDC antenna matching networks with the other towers open circuited at the corresponding J-Plug location, as was done in the original moment method proof of performance. This measurement location corresponds to the input to the diplex filter network for each tower. The impedance measurement was performed using a Hewlett-Packard Model 4396A network analyzer; an Amplifier Research Model 5W1000 power amplifier; and a Tunwall Radio directional coupler. The new measured impedances are contained in Figure 2.

2.2 INDIVIDUAL TOWER COMPUTER MODELS

The original moment method computer model and the separate circuit model were modified for each tower in order to replicate the new measured base impedances. The modified individual tower models were developed using Expert MiniNEC Broadcast Professional (Version 23.0). To replicate the individual measured base impedances to within the tolerance specified in the FCC's Rules, each tower's physical height and radius was adjusted in the MiniNEC model and series inductance and shunt capacitances were employed in a separate circuit model. Details of the modeled individual tower adjusted heights and radii are contained in Figure 1.

The values of the lumped series inductances and shunt capacitances used in the circuit models for each tower are contained in Figure 2. The measured individual tower impedances, the modeled individual tower impedances, and the adjusted modeled (circuit model) individual tower impedances are also contained in Figure 2. The percentage difference between the adjusted modeled tower heights and radii and the physical tower heights and radii are within the tolerances set forth in the FCC's Rules. The magnitude of the lumped series inductances and shunt capacitances that were used in the circuit models are also within the tolerances set forth in the FCC's Rules.

As demonstrated by the data contained in Figure 2, the adjusted modeled individual tower resistance and reactance for each tower is well within ±2 ohms and ±4 percent tolerance of the corresponding measured individual tower resistance and reactance. The text files containing all pertinent input and output data associated with the individual tower models are contained in Appendix A.

<u>2.3 DIRECTIONAL ANTENNA COMPUTER MODELS AND ANTENNA MONITOR PARAMETERS</u>

The theoretical directional field parameters and the licensed tower spacings and orientations were used in combination with the adjusted individual tower models to produce the daytime and nighttime directional antenna computer models. From the directional computer models, tower currents were derived for each wire segment of each antenna. Each segment current was multiplied by the segment length and numerically integrated and normalized to the appropriate reference tower to verify that the modeled current moments are essentially identical to the authorized relative directional field parameters.

The new daytime and nighttime directional array operating parameters were determined from the modeled currents at the sample loop height and are tabulated in Figure 3. Also included in Figure 3 is the adjusted common point impedance and common point current for the licensed daytime 50 kW operation and the licensed nighttime 20 kW operation.

The text files containing all pertinent input and output data associated with the daytime and nighttime directional antenna computer models are contained in Appendix B and Appendix C, respectively. Text files containing all pertinent input and output data associated with detune models for those towers that are not used in either the daytime operating mode or the nighttime operating mode are contained in Appendix D.

2.4 SAMPLE SYSTEM INFORMATION

The KRDC antenna monitor was replaced as part of the KSPN collocation and diplexing project. The new antenna monitor contains filters, installed by the manufacturer, to attenuate the KSPN signal picked up by the KRDC sample loops to a level that allows accurate monitoring of the KRDC relative loop current magnitude and phase. The new antenna monitor is a Potomac Instruments Model 1901-5, serial number 772, which was calibrated on June 11, 2022 just prior to the adjustment of the KRDC directional antenna systems for the new moment method model derived operating parameters.

Although not required, a measurement of the sample line impedance with the sample loop attached was performed for each tower to ensure that there had been no material deterioration of the sample loops, connectors or coaxial cables since the last moment method proof was performed in 2018. Figure 4 contains a comparison of the 2022 measured impedances and those contained in the 2018 license application. The measured resistance and reactance for each tower are within the ±2 Ohms and ±4 percent tolerance of the corresponding 2018 values.

3.0 OTHER ANTENNAS MOUNTED ON THE TOWERS

There is an FM translator antenna for station K256CX mounted on KRDC tower #2. A Kintronic Laboratories isocoupler is used to allow the coaxial cable from the FM translator antenna to cross the base insulator of the tower.

4.0 SUMMARY

It is submitted that the KRDC daytime and nighttime directional antenna patterns fully comply with the terms of the station’s FCC Authorization and all applicable FCC Rules and Regulations. It is requested that a superseding license be issued to ABC

Radio LA reflecting the new Moment Method model derived operating parameters as contained herein and on FCC Form 302-AM.

This engineering statement and the attached figures and appendices were prepared by the undersigned or under the direct supervision of the undersigned and are believed to be true and correct.

Dated: July 28, 2022

Figure 1

TOWER MODEL HEIGHT AND RADIUS

STATION KRDC - PASADENA, CALIFORNIA
1110 kHz - 50 kW DAY, 20 kW NIGHT, DA-2, U
JULY, 2022

Tower	Physical Height (meters)	Modeled Height (meters)	Percent of Physical Height	Modeled Radius (meters)	Percent of Equivalent Radius
1 (NE)	99.0	104.0	105.0	0.2911	100.0
2 (EC)	99.0	104.0	105.0	0.2620	90.0
3 (WC)	99.0	103.0	104.0	0.2474	85.0
4 (SW)	99.0	99.0	100.0	0.2911	100.0
5 (N)	99.0	104.0	105.0	0.2911	100.0

Figure 2

MEASURED AND MODELED IMPEDANCES

STATION KRDC - PASADENA, CALIFORNIA
1110 kHz - 50 kW Day, 20 kW NIGHT, DA-2, U
JULY, 2022

Tower	Measured Tower Base Impedance[1]	Modeled Tower Base Impedance	Shunt Capacitance (pF)	Modeled plus Shunt Reactance	Lumped Series Inductance (uH)	Total Adjusted Tower Base Impedance
1 (NE)	577.5 +j 472.0	369.5 +j 458.1	69.0	577.9 +j 455.8	2.3	577.9 +j 471.8
2 (EC)	769.2 +j 459.0	352.0 +j 488.8	112.0	769.0 +j 448.8	1.5	769.0 +j 459.3
3 (WC)	340.8 +j 539.7	258.3 +j 456.6	42.0	341.7 +j 497.3	6.1	341.7 +j 539.8
4 (SW)	417.3 +j 307.8	289.7 +j 292.8	92.0	417.4 +j 265.0	6.2	417.4 +j 308.2
5 (N)	678.7 +j 215.6	490.5 +j 333.7	89.0	680.0 +j 159.7	8.0	680.0 +j 215.5

[1] Measured at output of matching network with other towers open-circuited

Figure 3

ANTENNA MONITOR PARAMETERS AND COMMON POINT DATA

STATION KRDC - PASADENA, CALIFORNIA
1110 kHz - 50 kW DAY, 20 kW NIGHT, U, DA-2
JUNE, 2022

DAYTIME		
Tower	**Ratio**	**Phase (deg)**
4	0.685	-50.3
5	1.000	0.0
Common Point Impedance = 50 -j14 Ohms Common Point Current = 32.45 Amperes Antenna Input Power = 52,650 Watts		

NIGHTTIME		
Tower	**Ratio**	**Phase (deg)**
1	0.375	-147.1
2	1.036	107.0
3	1.000	0.0
4	0.344	-107.2
Common Point Impedance = 50 -j14 Ohms Common Point Current = 20.52 Amperes Antenna Input Power = 21,060 Watts		

Figure 4

SAMPLE LINE IMPEDANCE WITH LOOPS

STATION KRDC - PASADENA, CALIFORNIA
1110 kHz - 50 kW DAY, 20 kW NIGHT, DA-2, U
JULY, 2022

Tower	Measured Impedance 2018 MoM Proof	Measured Impedance June, 2022	Delta Impedance June, 2022
1	5.04 +j 29.30	4.57 +j 27.51	-0.47 +j -1.79
2	4.50 +j 29.90	4.56 +j 27.57	0.06 +j -2.33
3	5.35 +j 29.90	4.57 +j 27.56	-0.78 +j -2.34
4	5.00 +j 30.00	4.65 +j 27.51	-0.35 +j -2.49
5	4.77 +j 29.90	4.59 +j 28.32	-0.18 +j -1.58

APPENDIX A

INDIVIDUAL TOWER MODELS

Consulting Engineers
CTJC
CARL T. JONES CORPORATION

IMPEDANCE – TOWER #1 (Northeast)
normalization = 50.

freq (MHz)	resist (ohms)	react (ohms)	imped (ohms)	phase (deg)	VSWR	S11 dB	S12 dB
source = 1; node 100, sector 1							
1.11	369.46	458.06	588.49	51.1	18.83	-.92344	-7.1773

GEOMETRY – TOWER #1 (Northeast)
Wire coordinates in degrees; other dimensions in meters
Environment: perfect ground

wire	caps	Distance	Angle	Z	radius	segs
1	none	0	0	0	.2911	33
		0	0	132.		
2	none	90.	60.	0	.2474	33
		90.	60.	137.28		
3	none	180.	60.	0	.262	33
		180.	60.	138.6		
4	none	270.	60.	0	.2911	33
		270.	60.	138.6		
5	none	165.	14.	0	.2911	33
		165.	14.	138.6		

Number of wires = 5
current nodes = 165

	minimum		maximum	
Individual wires	wire	value	wire	value
segment length	1	4.	3	4.2
radius	2	.2474	1	.2911

ELECTRICAL DESCRIPTION – TOWER #1 (Northeast)
Frequencies (MHz)

no.	frequency lowest	step	no. of steps	segment length (wavelengths) minimum	maximum
1	1.11	0	1	.0111111	.0116667

Sources

source	node	sector	magnitude	phase	type
1	100	1	1.	0	voltage

Lumped loads

load	node	resistance (ohms)	reactance (ohms)	inductance (mH)	capacitance (uF)	passive circuit
1	1	.01	0	0	9.2E-05	0
2	34	.01	0	0	4.2E-05	0
3	67	.01	0	0	1.12E-04	0
4	100	.01	0	0	0	0
5	133	.01	0	0	8.9E-05	0

IMPEDANCE – TOWER #2 (East Center)
normalization = 50.

freq (MHz)	resist (ohms)	react (ohms)	imped (ohms)	phase (deg)	VSWR	S11 dB	S12 dB
source = 1; node 67, sector 1							
1.11	351.96	488.84	602.36	54.2	20.712	-.83937	-7.5512

GEOMETRY – TOWER #2 (East Center)
Wire coordinates in degrees; other dimensions in meters
Environment: perfect ground

wire	caps	Distance	Angle	Z	radius	segs
1	none	0	0	0	.2911	33
		0	0	132.		
2	none	90.	60.	0	.2474	33
		90.	60.	137.28		
3	none	180.	60.	0	.262	33
		180.	60.	138.6		
4	none	270.	60.	0	.2911	33
		270.	60.	138.6		
5	none	165.	14.	0	.2911	33
		165.	14.	138.6		

Number of wires = 5
current nodes = 165

	minimum		maximum	
Individual wires	wire	value	wire	value
segment length	1	4.	3	4.2
radius	2	.2474	1	.2911

ELECTRICAL DESCRIPTION – TOWER #2 (East Center)
Frequencies (MHz)

no.	frequency lowest	step	no. of steps	segment length (wavelengths) minimum	maximum
1	1.11	0	1	.0111111	.0116667

Sources

source	node	sector	magnitude	phase	type
1	67	1	1.	0	voltage

Lumped loads

load	node	resistance (ohms)	reactance (ohms)	inductance (mH)	capacitance (uF)	passive circuit
1	1	.01	0	0	9.2E-05	0
2	34	.01	0	0	4.2E-05	0
3	67	.01	0	0	0	0
4	100	.01	0	0	6.9E-05	0
5	133	.01	0	0	8.9E-05	0

IMPEDANCE – TOWER #3 (West Center)
normalization = 50.

freq (MHz)	resist (ohms)	react (ohms)	imped (ohms)	phase (deg)	VSWR	S11 dB	S12 dB
source = 1; node 34, sector 1							
1.11	258.34	456.64	524.65	60.5	21.457	-.81021	-7.6907

GEOMETRY – TOWER #3 (West Center)
Wire coordinates in degrees; other dimensions in meters
Environment: perfect ground

wire	caps	Distance	Angle	Z	radius	segs
1	none	0	0	0	.2911	33
		0	0	132.		
2	none	90.	60.	0	.2474	33
		90.	60.	137.28		
3	none	180.	60.	0	.262	33
		180.	60.	138.6		
4	none	270.	60.	0	.2911	33
		270.	60.	138.6		
5	none	165.	14.	0	.2911	33
		165.	14.	138.6		

Number of wires = 5
current nodes = 165

	minimum		maximum	
Individual wires	wire	value	wire	value
segment length	1	4.	3	4.2
radius	2	.2474	1	.2911

ELECTRICAL DESCRIPTION – TOWER #3 (West Center)
Frequencies (MHz)

no.	frequency lowest	step	no. of steps	segment length (wavelengths) minimum	maximum
1	1.11	0	1	.0111111	.0116667

Sources

source	node	sector	magnitude	phase	type
1	34	1	1.	0	voltage

Lumped loads

load	node	resistance (ohms)	reactance (ohms)	inductance (mH)	capacitance (uF)	passive circuit
1	1	.01	0	0	9.2E-05	0
2	34	.01	0	0	0	0
3	67	.01	0	0	1.12E-04	0
4	100	.01	0	0	6.9E-05	0
5	133	.01	0	0	8.9E-05	0

IMPEDANCE – TOWER #4 (Southwest)
normalization = 50.

freq (MHz)	resist (ohms)	react (ohms)	imped (ohms)	phase (deg)	VSWR	S11 dB	S12 dB
source = 1; node 1, sector 1							
1.11	289.71	292.8	411.9	45.3	11.801	-1.4756	-5.405

GEOMETRY – TOWER #4 (Southwest)
Wire coordinates in degrees; other dimensions in meters
Environment: perfect ground

wire	caps	Distance	Angle	Z	radius	segs
1	none	0	0	0	.2911	33
		0	0	132.		
2	none	90.	60.	0	.2474	33
		90.	60.	137.28		
3	none	180.	60.	0	.262	33
		180.	60.	138.6		
4	none	270.	60.	0	.2911	33
		270.	60.	138.6		
5	none	165.	14.	0	.2911	33
		165.	14.	138.6		

Number of wires = 5
current nodes = 165

Individual wires	minimum wire	minimum value	maximum wire	maximum value
segment length	1	4.	3	4.2
radius	2	.2474	1	.2911

ELECTRICAL DESCRIPTION – TOWER #4 (Southwest)
Frequencies (MHz)

no.	frequency lowest	step	no. of steps	segment length (wavelengths) minimum	maximum
1	1.11	0	1	.0111111	.0116667

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	1	.01	0	0	0	0
2	34	.01	0	0	4.2E-05	0
3	67	.01	0	0	1.12E-04	0
4	100	.01	0	0	6.9E-05	0
5	133	.01	0	0	8.9E-05	0

IMPEDANCE – TOWER #5 (North)
normalization = 50.

freq (MHz)	resist (ohms)	react (ohms)	imped (ohms)	phase (deg)	VSWR	S11 dB	S12 dB
source = 1; node 133, sector 1							
1.11	490.54	333.7	593.28	34.2	14.383	-1.2097	-6.1418

GEOMETRY – TOWER #5 (North)
Wire coordinates in degrees; other dimensions in meters
Environment: perfect ground

wire	caps	Distance	Angle	Z	radius	segs
1	none	0	0	0	.2911	33
		0	0	132.		
2	none	90.	60.	0	.2474	33
		90.	60.	137.28		
3	none	180.	60.	0	.262	33
		180.	60.	138.6		
4	none	270.	60.	0	.2911	33
		270.	60.	138.6		
5	none	165.	14.	0	.2911	33
		165.	14.	138.6		

Number of wires = 5
current nodes = 165

Individual wires	minimum wire	minimum value	maximum wire	maximum value
segment length	1	4.	3	4.2
radius	2	.2474	1	.2911

ELECTRICAL DESCRIPTION – TOWER #5 (North)
Frequencies (MHz)

no.	frequency lowest	step	no. of steps	segment length (wavelengths) minimum	maximum
1	1.11	0	1	.0111111	.0116667

Sources

source	node	sector	magnitude	phase	type
1	133	1	1.	0	voltage

Lumped loads

load	node	resistance (ohms)	reactance (ohms)	inductance (mH)	capacitance (uF)	passive circuit
1	1	.01	0	0	9.2E-05	0
2	34	.01	0	0	4.2E-05	0
3	67	.01	0	0	1.12E-04	0
4	100	.01	0	0	6.9E-05	0
5	133	.01	0	0	0	0

APPENDIX B

DAYTIME DIRECTIONAL MODEL

Consulting Engineers
CTJC
CARL T. JONES CORPORATION

IMPEDANCE – DAYTIME OPERATION
normalization = 50.

freq (MHz)	resist (ohms)	react (ohms)	imped (ohms)	phase (deg)	VSWR	S11 dB	S12 dB
source = 1; node 1, sector 1							
1.11	250.	151.57	292.36	31.2	6.8929	-2.5381	-3.5401
source = 2; node 133, sector 1							
1.11	290.32	387.71	484.36	53.2	16.272	-1.0689	-6.6119

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

wire	caps	Distance	Angle	Z	radius	segs
1	none	0	0	0	.2911	33
		0	0	132.		
2	none	90.	60.	0	.2474	33
		90.	60.	137.28		
3	none	180.	60.	0	.262	33
		180.	60.	138.6		
4	none	270.	60.	0	.2911	33
		270.	60.	138.6		
5	none	165.	14.	0	.2911	33
		165.	14.	138.6		

Number of wires = 5
current nodes = 165

Individual wires	minimum wire	minimum value	maximum wire	maximum value
segment length	1	4.	3	4.2
radius	2	.2474	1	.2911

ELECTRICAL DESCRIPTION – DAYTIME OPERATION
Frequencies (MHz)

no.	frequency lowest	step	no. of steps	segment length (wavelengths) minimum	maximum
1	1.11	0	1	.0111111	.0116667

Sources

source	node	sector	magnitude	phase	type
1	1	1	3,979.22	56.1	voltage
2	133	1	6,586.66	123.6	voltage

Lumped loads

load	node	resistance (ohms)	reactance (ohms)	inductance (mH)	capacitance (uF)	passive circuit
1	1	.01	0	0	0	0
2	34	.01	0	.046	0	0
3	67	.01	0	.044	0	0
4	100	.01	0	.043	0	0
5	133	.01	0	0	0	0

RMS CURRENT – DAYTIME OPERATION
Frequency = 1.11 MHz
Input power = 50,000. watts
Efficiency = 100. %
coordinates in degrees

current no.	X	Y	Z	mag (amps)	phase (deg)	real (amps)	imaginary (amps)
GND	0	0	0	9.62414	24.9	8.73022	4.0506

2	0	0	4.	10.505	17.6	10.0132	3.17675
3	0	0	8.	11.0752	13.8	10.7557	2.64099
4	0	0	12.	11.5661	10.8	11.36	2.1735
5	0	0	16.	11.991	8.4	11.8626	1.74995
6	0	0	20.	12.3557	6.3	12.2807	1.35902
7	0	0	24.	12.6618	4.5	12.6226	.995585
8	0	0	28.	12.9096	2.9	12.8929	.65706
9	0	0	32.	13.0988	1.5	13.0943	.342126
10	0	0	36.	13.2289	.2	13.2288	.0501556
11	0	0	40.	13.2996	359.1	13.2978	-.219085
12	0	0	44.	13.3106	358.	13.3024	-.46561
13	0	0	48.	13.2618	357.	13.2439	-.689314
14	0	0	52.	13.1536	356.1	13.1235	-.890028
15	0	0	56.	12.9862	355.3	12.9422	-1.06758
16	0	0	60.	12.7602	354.5	12.7016	-1.22181
17	0	0	64.	12.4766	353.8	12.4031	-1.35258
18	0	0	68.	12.1364	353.1	12.0483	-1.45979
19	0	0	72.	11.741	352.4	11.6391	-1.54344
20	0	0	76.	11.2918	351.8	11.1773	-1.60355
21	0	0	80.	10.7905	351.3	10.6651	-1.64021
22	0	0	84.	10.2389	350.7	10.1045	-1.6536
23	0	0	88.	9.63914	350.2	9.49793	-1.64392
24	0	0	92.	8.99323	349.7	8.84767	-1.61148
25	0	0	96.	8.30325	349.2	8.15605	-1.55655
26	0	0	100.	7.57129	348.7	7.42533	-1.47952
27	0	0	104.	6.79943	348.3	6.65776	-1.38072
28	0	0	108.	5.98922	347.9	5.85509	-1.26044
29	0	0	112.	5.14177	347.4	5.01856	-1.11887
30	0	0	116.	4.25701	347.	4.1483	-.955909
31	0	0	120.	3.33256	346.6	3.24218	-.770895
32	0	0	124.	2.36066	346.2	2.29285	-.561758
33	0	0	128.	1.32192	345.8	1.28176	-.32338
END	0	0	132.	0	0	0	0
GND	45.	-77.9423	0	4.62164	68.3	1.7121	4.29282
35	45.	-77.9423	4.16	3.83797	68.3	1.42128	3.5651
36	45.	-77.9423	8.32	3.33304	68.3	1.23277	3.09668
37	45.	-77.9423	12.48	2.88737	68.3	1.06529	2.68367
38	45.	-77.9423	16.64	2.47837	68.4	.91052	2.30505
39	45.	-77.9423	20.8	2.09637	68.6	.764948	1.95183
40	45.	-77.9423	24.96	1.73706	68.8	.627046	1.61993
41	45.	-77.9423	29.12	1.39844	69.2	.496175	1.30745
42	45.	-77.9423	33.28	1.07966	69.8	.37211	1.0135
43	45.	-77.9423	37.44	.780549	70.9	.254867	.737767
44	45.	-77.9423	41.6	.501542	73.2	.144595	.480247
45	45.	-77.9423	45.76	.244665	80.2	.0415213	.241116
46	45.	-77.9423	49.92	.0578973	159.1	-.0540895	.02065
47	45.	-77.9423	54.08	.229901	231.9	-.141957	-.180838
48	45.	-77.9423	58.24	.425427	238.6	-.221802	-.363031
49	45.	-77.9423	62.4	.601955	240.8	-.293362	-.525632
50	45.	-77.9423	66.56	.757464	241.9	-.356392	-.668383
51	45.	-77.9423	70.72	.891318	242.6	-.410681	-.791068
52	45.	-77.9423	74.88	1.0032	243.	-.456048	-.893549
53	45.	-77.9423	79.04	1.0929	243.2	-.492348	-.975722
54	45.	-77.9423	83.2	1.16036	243.4	-.519474	-1.03758
55	45.	-77.9423	87.36	1.20554	243.5	-.537359	-1.07915
56	45.	-77.9423	91.52	1.22854	243.6	-.545966	-1.10056
57	45.	-77.9423	95.68	1.22949	243.7	-.545294	-1.10196
58	45.	-77.9423	99.84	1.20862	243.7	-.535369	-1.08358
59	45.	-77.9423	104.	1.16617	243.7	-.516237	-1.04568
60	45.	-77.9423	108.16	1.10242	243.7	-.48795	-.988556
61	45.	-77.9423	112.32	1.01763	243.7	-.450551	-.91245
62	45.	-77.9423	116.48	.911961	243.7	-.404044	-.817571
63	45.	-77.9423	120.64	.785395	243.7	-.348329	-.703927

64	45.	-77.9423	124.8	.637437	243.6	-.283097	-.571124
65	45.	-77.9423	128.96	.466464	243.6	-.20752	-.417761
66	45.	-77.9423	133.12	.2681	243.5	-.119522	-.239984
END	45.	-77.9423	137.28	0	0	0	0
GND	90.	-155.885	0	2.90094	36.1	2.34517	1.70752
68	90.	-155.885	4.2	2.41548	36.1	1.95246	1.42213
69	90.	-155.885	8.4	2.10531	36.1	1.70096	1.24059
70	90.	-155.885	12.6	1.83153	36.2	1.4784	1.08112
71	90.	-155.885	16.8	1.58027	36.3	1.27357	.935552
72	90.	-155.885	21.	1.34553	36.5	1.08165	.800296
73	90.	-155.885	25.2	1.12465	36.8	.900507	.673742
74	90.	-155.885	29.4	.916385	37.3	.72914	.555083
75	90.	-155.885	33.6	.720237	38.1	.567157	.44393
76	90.	-155.885	37.8	.536129	39.4	.414444	.340103
77	90.	-155.885	42.	.364418	41.9	.271084	.243545
78	90.	-155.885	46.2	.206479	48.3	.137254	.154257
79	90.	-155.885	50.4	.0734714	79.7	.0131868	.0722783
80	90.	-155.885	54.6	.100884	181.3	-.100857	-2.34E-03
81	90.	-155.885	58.8	.216115	198.8	-.204613	-.0695649
82	90.	-155.885	63.	.3247	203.5	-.297824	-.129348
83	90.	-155.885	67.2	.421426	205.5	-.380254	-.181678
84	90.	-155.885	71.4	.505323	206.6	-.451691	-.226556
85	90.	-155.885	75.6	.576018	207.3	-.511952	-.264012
86	90.	-155.885	79.8	.633318	207.7	-.56089	-.294098
87	90.	-155.885	84.	.677126	207.9	-.598396	-.316893
88	90.	-155.885	88.2	.70741	208.	-.624394	-.332506
89	90.	-155.885	92.4	.72419	208.1	-.638847	-.341065
90	90.	-155.885	96.6	.727533	208.1	-.64175	-.342726
91	90.	-155.885	100.8	.717542	208.1	-.633128	-.337663
92	90.	-155.885	105.	.694349	208.	-.613027	-.326066
93	90.	-155.885	109.2	.658099	207.9	-.581503	-.308136
94	90.	-155.885	113.4	.608924	207.8	-.538602	-.28407
95	90.	-155.885	117.6	.546909	207.7	-.484324	-.254047
96	90.	-155.885	121.8	.472014	207.5	-.418555	-.218194
97	90.	-155.885	126.	.383916	207.4	-.340931	-.176515
98	90.	-155.885	130.2	.281602	207.2	-.250467	-.128708
99	90.	-155.885	134.4	.162406	207.	-.144699	-.073742
END	90.	-155.885	138.6	0	0	0	0
GND	135.	-233.827	0	1.78084	338.2	1.65383	-.660469
101	135.	-233.827	4.2	1.47487	338.2	1.36986	-.546557
102	135.	-233.827	8.4	1.28333	338.3	1.19249	-.474246
103	135.	-233.827	12.6	1.11428	338.4	1.03633	-.409455
104	135.	-233.827	16.8	.959228	338.7	.893465	-.349056
105	135.	-233.827	21.	.814331	339.	.760302	-.291677
106	135.	-233.827	25.2	.677944	339.6	.635262	-.236747
107	135.	-233.827	29.4	.549314	340.4	.517566	-.184042
108	135.	-233.827	33.6	.428202	341.8	.406855	-.133512
109	135.	-233.827	37.8	.314744	344.3	.302991	-.0852056
110	135.	-233.827	42.	.209661	349.2	.205958	-.039231
111	135.	-233.827	46.2	.115892	2.1	.115813	4.27E-03
112	135.	-233.827	50.4	.055697	54.1	.0326478	.0451252
113	135.	-233.827	54.6	.0938208	117.6	-.04343	.0831635
114	135.	-233.827	58.8	.163048	133.5	-.112309	.118201
115	135.	-233.827	63.	.229678	139.2	-.173885	.150054
116	135.	-233.827	67.2	.289643	141.9	-.228067	.178546
117	135.	-233.827	71.4	.341935	143.5	-.274784	.203503
118	135.	-233.827	75.6	.386141	144.4	-.313984	.224764
119	135.	-233.827	79.8	.422037	145.	-.345639	.242176
120	135.	-233.827	84.	.449491	145.3	-.369745	.255599
121	135.	-233.827	88.2	.468424	145.6	-.386323	.264906
122	135.	-233.827	92.4	.478796	145.7	-.395418	.269983
123	135.	-233.827	96.6	.480602	145.7	-.397096	.270726
124	135.	-233.827	100.8	.473858	145.7	-.391446	.267043

125	135.	-233.827	105.	.458601	145.6	-.378566	.25885
126	135.	-233.827	109.2	.434875	145.5	-.358565	.246064
127	135.	-233.827	113.4	.402715	145.4	-.331546	.228598
128	135.	-233.827	117.6	.362123	145.3	-.297584	.206341
129	135.	-233.827	121.8	.313014	145.1	-.256689	.179133
130	135.	-233.827	126.	.255112	144.9	-.208715	.146698
131	135.	-233.827	130.2	.187668	144.7	-.153137	.108481
132	135.	-233.827	134.4	.108859	144.5	-.0885715	.0632877
END	135.	-233.827	138.6	0	0	0	0
GND	160.099	-39.9171	0	9.61573	70.5	3.21359	9.06284
134	160.099	-39.9171	4.2	11.83	62.8	5.4138	10.5185
135	160.099	-39.9171	8.4	13.2231	59.3	6.7415	11.3756
136	160.099	-39.9171	12.6	14.4132	56.9	7.86437	12.0786
137	160.099	-39.9171	16.8	15.451	55.1	8.84463	12.6691
138	160.099	-39.9171	21.	16.36	53.6	9.71069	13.1663
139	160.099	-39.9171	25.2	17.1503	52.4	10.4756	13.5792
140	160.099	-39.9171	29.4	17.8267	51.3	11.1459	13.9125
141	160.099	-39.9171	33.6	18.3916	50.4	11.7253	14.1692
142	160.099	-39.9171	37.8	18.8461	49.6	12.2157	14.351
143	160.099	-39.9171	42.	19.1909	48.9	12.6183	14.4593
144	160.099	-39.9171	46.2	19.4266	48.3	12.9338	14.4951
145	160.099	-39.9171	50.4	19.5535	47.7	13.1628	14.4596
146	160.099	-39.9171	54.6	19.5723	47.2	13.3058	14.3538
147	160.099	-39.9171	58.8	19.4839	46.7	13.3633	14.179
148	160.099	-39.9171	63.	19.2894	46.3	13.3362	13.9365
149	160.099	-39.9171	67.2	18.9904	45.9	13.2257	13.6278
150	160.099	-39.9171	71.4	18.5886	45.5	13.0327	13.2546
151	160.099	-39.9171	75.6	18.0864	45.1	12.7589	12.8191
152	160.099	-39.9171	79.8	17.4862	44.8	12.406	12.323
153	160.099	-39.9171	84.	16.7909	44.5	11.9761	11.7689
154	160.099	-39.9171	88.2	16.0036	44.2	11.4712	11.1592
155	160.099	-39.9171	92.4	15.1278	43.9	10.8938	10.4964
156	160.099	-39.9171	96.6	14.1671	43.7	10.2466	9.78339
157	160.099	-39.9171	100.8	13.1252	43.4	9.53222	9.02268
158	160.099	-39.9171	105.	12.0059	43.2	8.75341	8.21707
159	160.099	-39.9171	109.2	10.8128	43.	7.91274	7.36918
160	160.099	-39.9171	113.4	9.54895	42.7	7.0126	6.4812
161	160.099	-39.9171	117.6	8.21661	42.5	6.05456	5.55473
162	160.099	-39.9171	121.8	6.81624	42.3	5.03897	4.5902
163	160.099	-39.9171	126.	5.34466	42.1	3.96345	3.5856
164	160.099	-39.9171	130.2	3.79007	41.9	2.81913	2.5332
165	160.099	-39.9171	134.4	2.12154	41.8	1.58278	1.4127
END	160.099	-39.9171	138.6	0	0	0	0

APPENDIX C

NIGHTTIME DIRECTIONAL MODEL

IMPEDANCE – NIGHTTIME OPERATION
normalization = 50.

freq (MHz)	resist (ohms)	react (ohms)	imped (ohms)	phase (deg)	VSWR	S11 dB	S12 dB
source = 1; node 1, sector 1							
1.11	692.43	-1,064.7	1,270.1	303.	46.643	-.3725	-10.851
source = 2; node 34, sector 1							
1.11	684.04	479.37	835.28	35.	20.424	-.85125	-7.4959
source = 3; node 67, sector 1							
1.11	292.6	413.9	506.88	54.7	17.676	-.98384	-6.9313
source = 4; node 100, sector 1							
1.11	99.916	307.68	323.49	72.	21.401	-.81233	-7.6804

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

wire	caps	Distance	Angle	Z	radius	segs
1	none	0	0	0	.2911	33
		0	0	132.		
2	none	90.	60.	0	.2474	33
		90.	60.	137.28		
3	none	180.	60.	0	.262	33
		180.	60.	138.6		
4	none	270.	60.	0	.2911	33
		270.	60.	138.6		
5	none	165.	14.	0	.2911	33
		165.	14.	138.6		

Number of wires = 5
current nodes = 165

	minimum		maximum	
Individual wires	wire	value	wire	value
segment length	1	4.	3	4.2
radius	2	.2474	1	.2911

ELECTRICAL DESCRIPTION – NIGHTTIME OPERATION
Frequencies (MHz)

no.	frequency lowest	step	no. of steps	segment length (wavelengths) minimum	maximum
1	1.11	0	1	.0111111	.0116667

Sources

source	node	sector	magnitude	phase	type
1	1	1	2,513.92	80.7	voltage
2	34	1	4,563.68	182.7	voltage
3	67	1	3,726.81	290.8	voltage
4	100	1	1,048.8	41.4	voltage

Lumped loads

load	node	resistance (ohms)	reactance (ohms)	inductance (mH)	capacitance (uF)	passive circuit
1	1	.01	0	0	0	0
2	34	.01	0	0	0	0
3	67	.01	0	0	0	0
4	100	.01	0	0	0	0
5	133	.01	0	.043	0	0

RMS CURRENT – NIGHTTIME OPERATION
Frequency = 1.11 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	1.39962	137.7	-1.03514	.94203
2	0	0	4.	.784158	94.5	-.0617612	.781722
3	0	0	8.	.860448	52.4	.525363	.681443
4	0	0	12.	1.18634	29.9	1.02808	.591994
5	0	0	16.	1.55908	19.1	1.47366	.508999
6	0	0	20.	1.92358	12.9	1.87479	.430483
7	0	0	24.	2.26543	9.	2.23735	.355618
8	0	0	28.	2.57999	6.3	2.56431	.284059
9	0	0	32.	2.86542	4.3	2.85729	.215713
10	0	0	36.	3.12079	2.8	3.11715	.150623
11	0	0	40.	3.34551	1.5	3.34433	.088916
12	0	0	44.	3.53919	.5	3.53905	.0307669
13	0	0	48.	3.70149	359.6	3.70141	-.0236231
14	0	0	52.	3.83219	358.9	3.83148	-.0740399
15	0	0	56.	3.93116	358.2	3.92932	-.120268
16	0	0	60.	3.99833	357.7	3.99505	-.162098
17	0	0	64.	4.03374	357.2	4.02881	-.19933
18	0	0	68.	4.03751	356.7	4.03085	-.23178
19	0	0	72.	4.00987	356.3	4.00147	-.259284
20	0	0	76.	3.95114	355.9	3.94109	-.281699
21	0	0	80.	3.86175	355.6	3.85017	-.298903
22	0	0	84.	3.74219	355.2	3.72927	-.310798
23	0	0	88.	3.59306	354.9	3.57902	-.317307
24	0	0	92.	3.41499	354.7	3.40012	-.318375
25	0	0	96.	3.20868	354.4	3.19329	-.313964
26	0	0	100.	2.97483	354.1	2.95925	-.30405
27	0	0	104.	2.71411	353.9	2.69872	-.288616
28	0	0	108.	2.42707	353.7	2.41227	-.267638
29	0	0	112.	2.11404	353.5	2.10025	-.241071
30	0	0	116.	1.77484	353.2	1.76252	-.208806
31	0	0	120.	1.40829	353.	1.39792	-.170602
32	0	0	124.	1.01078	352.8	1.00291	-.125889
33	0	0	128.	.573473	352.6	.56876	-.0733738
END	0	0	132.	0	0	0	0
GND	45.	-77.9423	0	3.86338	147.7	-3.26514	2.06508
35	45.	-77.9423	4.16	5.02484	131.7	-3.34076	3.75345
36	45.	-77.9423	8.32	5.87353	125.1	-3.37759	4.80522
37	45.	-77.9423	12.48	6.63423	120.8	-3.3983	5.69777
38	45.	-77.9423	16.64	7.32069	117.7	-3.40533	6.48045
39	45.	-77.9423	20.8	7.93951	115.4	-3.39984	7.17474
40	45.	-77.9423	24.96	8.49311	113.5	-3.38247	7.79049
41	45.	-77.9423	29.12	8.9822	111.9	-3.35369	8.33263
42	45.	-77.9423	33.28	9.40702	110.6	-3.31387	8.80399
43	45.	-77.9423	37.44	9.76727	109.5	-3.26337	9.20598
44	45.	-77.9423	41.6	10.0625	108.6	-3.20255	9.53931
45	45.	-77.9423	45.76	10.2925	107.7	-3.13178	9.80448
46	45.	-77.9423	49.92	10.457	107.	-3.05147	10.0019
47	45.	-77.9423	54.08	10.556	106.3	-2.96203	10.1319
48	45.	-77.9423	58.24	10.5895	105.7	-2.8639	10.1949
49	45.	-77.9423	62.4	10.5578	105.1	-2.75757	10.1913
50	45.	-77.9423	66.56	10.4616	104.6	-2.64352	10.1221
51	45.	-77.9423	70.72	10.3017	104.2	-2.5223	9.98811
52	45.	-77.9423	74.88	10.0789	103.7	-2.39443	9.79033
53	45.	-77.9423	79.04	9.7946	103.3	-2.26048	9.53019
54	45.	-77.9423	83.2	9.45019	103.	-2.12103	9.20909
55	45.	-77.9423	87.36	9.04745	102.6	-1.97667	8.82888

56	45.	-77.9423	91.52	8.58805	102.3	-1.82797	8.39125
57	45.	-77.9423	95.68	8.07409	102.	-1.67555	7.89832
58	45.	-77.9423	99.84	7.50763	101.7	-1.51996	7.35215
59	45.	-77.9423	104.	6.89076	101.4	-1.36178	6.75486
60	45.	-77.9423	108.16	6.2255	101.1	-1.20153	6.10845
61	45.	-77.9423	112.32	5.51366	100.9	-1.03967	5.41475
62	45.	-77.9423	116.48	4.75654	100.6	-.876552	4.67508
63	45.	-77.9423	120.64	3.95446	100.4	-.712376	3.88977
64	45.	-77.9423	124.8	3.10562	100.1	-.546976	3.05708
65	45.	-77.9423	128.96	2.20337	99.9	-.3794	2.17046
66	45.	-77.9423	133.12	1.22928	99.7	-.206847	1.21176
END	45.	-77.9423	137.28	0	0	0	0
GND	90.	-155.885	0	5.19894	236.	-2.90496	-4.31163
68	90.	-155.885	4.2	6.41016	228.7	-4.23488	-4.81207
69	90.	-155.885	8.4	7.1859	225.3	-5.05221	-5.11003
70	90.	-155.885	12.6	7.84878	223.	-5.74157	-5.35143
71	90.	-155.885	16.8	8.42784	221.2	-6.34155	-5.55097
72	90.	-155.885	21.	8.93579	219.8	-6.86914	-5.71517
73	90.	-155.885	25.2	9.37811	218.6	-7.33214	-5.84711
74	90.	-155.885	29.4	9.75749	217.6	-7.73463	-5.94845
75	90.	-155.885	33.6	10.0752	216.7	-8.07878	-6.02017
76	90.	-155.885	37.8	10.3317	215.9	-8.36572	-6.06291
77	90.	-155.885	42.	10.5275	215.3	-8.59624	-6.07718
78	90.	-155.885	46.2	10.6626	214.7	-8.77083	-6.06337
79	90.	-155.885	50.4	10.7375	214.1	-8.88983	-6.02195
80	90.	-155.885	54.6	10.7522	213.6	-8.95368	-5.95335
81	90.	-155.885	58.8	10.7075	213.2	-8.96288	-5.85809
82	90.	-155.885	63.	10.6038	212.8	-8.91797	-5.73676
83	90.	-155.885	67.2	10.4419	212.4	-8.81962	-5.59003
84	90.	-155.885	71.4	10.223	212.	-8.66879	-5.41866
85	90.	-155.885	75.6	9.94823	211.7	-8.46656	-5.22348
86	90.	-155.885	79.8	9.61898	211.4	-8.21405	-5.00542
87	90.	-155.885	84.	9.23684	211.1	-7.91261	-4.76548
88	90.	-155.885	88.2	8.80367	210.8	-7.56386	-4.50474
89	90.	-155.885	92.4	8.32134	210.5	-7.16937	-4.22432
90	90.	-155.885	96.6	7.79193	210.3	-6.73093	-3.9254
91	90.	-155.885	100.8	7.21753	210.	-6.25032	-3.60919
92	90.	-155.885	105.	6.60029	209.8	-5.7294	-3.27685
93	90.	-155.885	109.2	5.94225	209.5	-5.16993	-2.92954
94	90.	-155.885	113.4	5.24525	209.3	-4.57348	-2.56826
95	90.	-155.885	117.6	4.5106	209.1	-3.94118	-2.19377
96	90.	-155.885	121.8	3.73871	208.9	-3.27337	-1.80639
97	90.	-155.885	126.	2.92799	208.7	-2.56861	-1.40549
98	90.	-155.885	130.2	2.07229	208.5	-1.82143	-.988325
99	90.	-155.885	134.4	1.15462	208.3	-1.01679	-.547068
END	90.	-155.885	138.6	0	0	0	0
GND	135.	-233.827	0	2.29252	329.4	1.97311	-1.16725
101	135.	-233.827	4.2	2.69386	326.6	2.24959	-1.48196
102	135.	-233.827	8.4	2.93345	325.3	2.41199	-1.66956
103	135.	-233.827	12.6	3.13201	324.3	2.54475	-1.82585
104	135.	-233.827	16.8	3.30061	323.6	2.65578	-1.95981
105	135.	-233.827	21.	3.44429	322.9	2.74869	-2.07552
106	135.	-233.827	25.2	3.56535	322.4	2.82514	-2.17493
107	135.	-233.827	29.4	3.665	321.9	2.886	-2.25904
108	135.	-233.827	33.6	3.74391	321.5	2.93177	-2.32844
109	135.	-233.827	37.8	3.80249	321.2	2.96276	-2.38348
110	135.	-233.827	42.	3.84099	320.9	2.97918	-2.4244
111	135.	-233.827	46.2	3.85966	320.6	2.9812	-2.4514
112	135.	-233.827	50.4	3.85869	320.3	2.969	-2.46465
113	135.	-233.827	54.6	3.83831	320.1	2.94275	-2.46431
114	135.	-233.827	58.8	3.79881	319.8	2.90269	-2.45058
115	135.	-233.827	63.	3.74049	319.6	2.84905	-2.42366
116	135.	-233.827	67.2	3.66371	319.4	2.78214	-2.38379

117	135.	-233.827	71.4	3.56893	319.2	2.70233	-2.33124
118	135.	-233.827	75.6	3.45663	319.	2.60999	-2.26633
119	135.	-233.827	79.8	3.32736	318.9	2.50557	-2.18939
120	135.	-233.827	84.	3.18172	318.7	2.38957	-2.1008
121	135.	-233.827	88.2	3.0204	318.5	2.26252	-2.00096
122	135.	-233.827	92.4	2.8441	318.3	2.12499	-1.89031
123	135.	-233.827	96.6	2.65354	318.2	1.97759	-1.76929
124	135.	-233.827	100.8	2.44949	318.	1.82092	-1.63837
125	135.	-233.827	105.	2.2327	317.9	1.65558	-1.49799
126	135.	-233.827	109.2	2.00389	317.7	1.48218	-1.3486
127	135.	-233.827	113.4	1.76369	317.5	1.30122	-1.19057
128	135.	-233.827	117.6	1.51259	317.4	1.11312	-1.02415
129	135.	-233.827	121.8	1.25071	317.2	.918045	-.849385
130	135.	-233.827	126.	.977526	317.1	.715671	-.665862
131	135.	-233.827	130.2	.69097	316.9	.504546	-.472094
132	135.	-233.827	134.4	.38552	316.7	.280741	-.264216
END	135.	-233.827	138.6	0	0	0	0
GND	160.099	-39.9171	0	1.63172	201.7	-1.51612	-.603239
134	160.099	-39.9171	4.2	1.35133	201.7	-1.25551	-.499793
135	160.099	-39.9171	8.4	1.17572	201.7	-1.0921	-.43548
136	160.099	-39.9171	12.6	1.02066	201.8	-.947624	-.37915
137	160.099	-39.9171	16.8	.878336	201.9	-.814836	-.327899
138	160.099	-39.9171	21.	.745256	202.1	-.690492	-.280407
139	160.099	-39.9171	25.2	.619884	202.4	-.573172	-.236072
140	160.099	-39.9171	29.4	.50151	202.8	-.46222	-.19459
141	160.099	-39.9171	33.6	.389851	203.6	-.357365	-.155802
142	160.099	-39.9171	37.8	.284876	204.8	-.258541	-.119629
143	160.099	-39.9171	42.	.186794	207.4	-.165803	-.086031
144	160.099	-39.9171	46.2	.0964814	214.8	-.0792718	-.0549967
145	160.099	-39.9171	50.4	.0265385	271.9	8.94E-04	-.0265234
146	160.099	-39.9171	54.6	.0745239	359.5	.0745214	-6.15E-04
147	160.099	-39.9171	58.8	.143247	9.1	.141433	.0227244
148	160.099	-39.9171	63.	.206101	12.2	.20146	.0434924
149	160.099	-39.9171	67.2	.261818	13.6	.254446	.0616913
150	160.099	-39.9171	71.4	.310053	14.4	.300255	.0773286
151	160.099	-39.9171	75.6	.35063	14.9	.338772	.0904172
152	160.099	-39.9171	79.8	.383441	15.3	.369906	.100979
153	160.099	-39.9171	84.	.408419	15.5	.393594	.10904
154	160.099	-39.9171	88.2	.425528	15.6	.409796	.114635
155	160.099	-39.9171	92.4	.434766	15.7	.418501	.117804
156	160.099	-39.9171	96.6	.436152	15.8	.419719	.118596
157	160.099	-39.9171	100.8	.429732	15.8	.413481	.117062
158	160.099	-39.9171	105.	.415566	15.8	.399834	.11326
159	160.099	-39.9171	109.2	.393723	15.8	.378835	.107247
160	160.099	-39.9171	113.4	.364263	15.8	.350528	.0990814
161	160.099	-39.9171	117.6	.327218	15.7	.314935	.0888121
162	160.099	-39.9171	121.8	.282543	15.7	.271998	.0764695
163	160.099	-39.9171	126.	.230022	15.6	.221497	.062041
164	160.099	-39.9171	130.2	.169014	15.6	.162802	.0454021
165	160.099	-39.9171	134.4	.0979174	15.5	.0943529	.026179
END	160.099	-39.9171	138.6	0	0	0	0

APPENDIX D

DETUNED TOWER MODELS

Consulting Engineers

CTJC

CARL T. JONES CORPORATION

ELECTRICAL DESCRIPTION – TOWERS #1 (Northeast) and #5 (North) DETUNE
Frequencies (MHz)

no.	frequency lowest	step	no. of steps	segment length (wavelengths) minimum	maximum
1	1.11	0	1	.0116667	.0116667

Plane wave source
zenith angle (deg) = 90
increment (deg) = 0
number of angles = 1
azimuth angle (deg) = 0
increment (deg) = 0
number of angles = 1
polarization angle (deg) = 0
magnitude (v/m) = 1

Lumped loads

load	node	resistance (ohms)	reactance (ohms)	inductance (mH)	capacitance (uF)	passive circuit
1	1	1.E-03	0	.043	0	0

GEOMETRY – TOWERS #1 (Northeast) and #5 (North) DETUNE
Wire coordinates in degrees; other dimensions in meters
Environment: perfect ground

wire	caps	Distance	Angle	Z	radius	segs
1	none	0	0	0	.2911	33
		0	0	138.6		

Number of wires = 1
current nodes = 33

Individual wires	minimum wire	value	maximum wire	value
segment length	1	4.2	1	4.2
radius	1	.2911	1	.2911

RMS CURRENTS – TOWERS #1 (Northeast) and #5 (North) DETUNE
Frequency = 1.11 MHz
Plane wave zenith (deg) = 90
Plane wave azimuth (deg) = 0
Polarization angle (deg) = 0
coordinates in degrees

current no.	X	Y	Z	mag (amps)	phase (deg)	real (amps)	imaginary (amps)
GND	0	0	0	.290301	270.7	3.72E-03	-.290277
2	0	0	4.2	.240346	270.7	3.08E-03	-.240327
3	0	0	8.4	.208892	270.7	2.69E-03	-.208875
4	0	0	12.6	.180956	270.7	2.34E-03	-.180941
5	0	0	16.8	.155152	270.7	2.03E-03	-.155139
6	0	0	21.	.130863	270.8	1.74E-03	-.130852
7	0	0	25.2	.107825	270.8	1.47E-03	-.107815
8	0	0	29.4	.0859178	270.8	1.22E-03	-.0859092
9	0	0	33.6	.0650974	270.9	9.82E-04	-.06509
10	0	0	37.8	.0453613	271.	7.64E-04	-.0453549
11	0	0	42.	.0267305	271.2	5.63E-04	-.0267246
12	0	0	46.2	9.24E-03	272.3	3.79E-04	-9.23E-03
13	0	0	50.4	7.08E-03	88.3	2.11E-04	7.07E-03
14	0	0	54.6	.0221503	89.8	5.89E-05	.0221503
15	0	0	58.8	.0359476	90.1	-7.64E-05	.0359475
16	0	0	63.	.0484167	90.2	-1.96E-04	.0484163
17	0	0	67.2	.05951	90.3	-2.99E-04	.0595093

18	0	0	71.4	.0691829	90.3	-3.86E-04	.0691818
19	0	0	75.6	.0773935	90.3	-4.58E-04	.0773921
20	0	0	79.8	.0841056	90.4	-5.14E-04	.084104
21	0	0	84.	.0892839	90.4	-5.56E-04	.0892821
22	0	0	88.2	.0929008	90.4	-5.83E-04	.092899
23	0	0	92.4	.0949303	90.4	-5.96E-04	.0949284
24	0	0	96.6	.0953517	90.4	-5.97E-04	.0953498
25	0	0	100.8	.0941474	90.4	-5.84E-04	.0941456
26	0	0	105.	.0913005	90.4	-5.6E-04	.0912988
27	0	0	109.2	.0867968	90.3	-5.25E-04	.0867952
28	0	0	113.4	.0806166	90.3	-4.79E-04	.0806151
29	0	0	117.6	.0727342	90.3	-4.24E-04	.072733
30	0	0	121.8	.0631038	90.3	-3.6E-04	.0631028
31	0	0	126.	.0516386	90.3	-2.88E-04	.0516378
32	0	0	130.2	.0381531	90.3	-2.07E-04	.0381525
33	0	0	134.4	.0222374	90.3	-1.17E-04	.0222371
END	0	0	138.6	0	0	0	0

ELECTRICAL DESCRIPTION – TOWER #2 (East Center) DETUNE
Frequencies (MHz)

no.	frequency lowest	step	no. of steps	segment length (wavelengths) minimum	maximum
1	1.11	0	1	.0116667	.0116667

Plane wave source
zenith angle (deg) = 90
increment (deg) = 0
number of angles = 1
azimuth angle (deg) = 0
increment (deg) = 0
number of angles = 1
polarization angle (deg) = 0
magnitude (v/m) = 1

Lumped loads

load	node	resistance (ohms)	reactance (ohms)	inductance (mH)	capacitance (uF)	passive circuit
1	1	1.E-03	0	.044	0	0

GEOMETRY – TOWER #2 (East Center) DETUNE
Wire coordinates in degrees; other dimensions in meters
Environment: perfect ground

wire	caps	Distance	Angle	Z	radius	segs
1	none	0	0	0	.262	33
		0	0	138.6		

Number of wires = 1
current nodes = 33

Individual wires	minimum wire	value	maximum wire	value
segment length	1	4.2	1	4.2
radius	1	.262	1	.262

RMS CURRENTS – TOWER #2 (East Center) DETUNE
Frequency = 1.11 MHz
Plane wave zenith (deg) = 90
Plane wave azimuth (deg) = 0
Polarization angle (deg) = 0
coordinates in degrees

current no.	X	Y	Z	mag (amps)	phase (deg)	real (amps)	imaginary (amps)
GND	0	0	0	.282658	270.8	3.83E-03	-.282632
2	0	0	4.2	.235265	270.8	3.19E-03	-.235244
3	0	0	8.4	.204771	270.8	2.78E-03	-.204752
4	0	0	12.6	.177645	270.8	2.43E-03	-.177628
5	0	0	16.8	.152543	270.8	2.11E-03	-.152529
6	0	0	21.	.128887	270.8	1.81E-03	-.128875
7	0	0	25.2	.106429	270.8	1.53E-03	-.106418
8	0	0	29.4	.0850595	270.9	1.27E-03	-.0850501
9	0	0	33.6	.0647387	270.9	1.02E-03	-.0647306
10	0	0	37.8	.0454668	271.	7.96E-04	-.0454598
11	0	0	42.	.0272664	271.2	5.86E-04	-.0272601
12	0	0	46.2	.010175	272.2	3.94E-04	-.0101674
13	0	0	50.4	5.78E-03	87.8	2.18E-04	5.78E-03
14	0	0	54.6	.0205203	89.8	5.88E-05	.0205202
15	0	0	58.8	.0340189	90.1	-8.34E-05	.0340188
16	0	0	63.	.0462231	90.3	-2.09E-04	.0462227
17	0	0	67.2	.057086	90.3	-3.18E-04	.0570851

18	0	0	71.4	.0665632	90.4	-4.1E-04	.0665619
19	0	0	75.6	.0746141	90.4	-4.86E-04	.0746125
20	0	0	79.8	.0812017	90.4	-5.47E-04	.0811999
21	0	0	84.	.0862924	90.4	-5.91E-04	.0862904
22	0	0	88.2	.0898592	90.4	-6.21E-04	.089857
23	0	0	92.4	.0918759	90.4	-6.36E-04	.0918737
24	0	0	96.6	.0923221	90.4	-6.37E-04	.0923199
25	0	0	100.8	.0911814	90.4	-6.25E-04	.0911793
26	0	0	105.	.0884385	90.4	-6.E-04	.0884364
27	0	0	109.2	.0840776	90.4	-5.63E-04	.0840757
28	0	0	113.4	.0780826	90.4	-5.15E-04	.0780809
29	0	0	117.6	.0704271	90.4	-4.57E-04	.0704256
30	0	0	121.8	.0610693	90.4	-3.89E-04	.0610681
31	0	0	126.	.0499277	90.4	-3.11E-04	.0499268
32	0	0	130.2	.036827	90.3	-2.24E-04	.0368263
33	0	0	134.4	.0213693	90.3	-1.27E-04	.0213689
END	0	0	138.6	0	0	0	0

ELECTRICAL DESCRIPTION – TOWERS #3 (West Center) DETUNE
Frequencies (MHz)

no.	frequency lowest	step	no. of steps	segment length (wavelengths) minimum	maximum
1	1.11	0	1	.0115556	.0115556

Plane wave source
zenith angle (deg) = 90
increment (deg) = 0
number of angles = 1
azimuth angle (deg) = 0
increment (deg) = 0
number of angles = 1
polarization angle (deg) = 0
magnitude (v/m) = 1

Lumped loads

load	node	resistance (ohms)	reactance (ohms)	inductance (mH)	capacitance (uF)	passive circuit
1	1	1.E-03	0	.046	0	0

GEOMETRY – TOWERS #3 (West Center) DETUNE
Wire coordinates in degrees; other dimensions in meters
Environment: perfect ground

wire	caps	Distance	Angle	Z	radius	segs
1	none	0	0	0	.2474	33
		0	0	137.28		

Number of wires = 1
current nodes = 33

Individual wires	minimum wire	value	maximum wire	value
segment length	1	4.16	1	4.16
radius	1	.2474	1	.2474

RMS CURRENTS – TOWERS #3 (West Center) DETUNE
Frequency = 1.11 MHz
Plane wave zenith (deg) = 90
Plane wave azimuth (deg) = 0
Polarization angle (deg) = 0
coordinates in degrees

current no.	X	Y	Z	mag (amps)	phase (deg)	real (amps)	imaginary (amps)
GND	0	0	0	.271837	270.5	2.56E-03	-.271825
2	0	0	4.16	.225663	270.5	2.13E-03	-.225653
3	0	0	8.32	.195727	270.5	1.85E-03	-.195719
4	0	0	12.48	.169123	270.5	1.61E-03	-.169115
5	0	0	16.64	.144525	270.6	1.39E-03	-.144519
6	0	0	20.8	.121373	270.6	1.19E-03	-.121367
7	0	0	24.96	.0994222	270.6	1.E-03	-.0994171
8	0	0	29.12	.078564	270.6	8.31E-04	-.0785596
9	0	0	33.28	.058758	270.7	6.7E-04	-.0587542
10	0	0	37.44	.0400032	270.7	5.21E-04	-.0399998
11	0	0	41.6	.022319	271.	3.84E-04	-.0223157
12	0	0	45.76	5.74E-03	272.6	2.59E-04	-5.73E-03
13	0	0	49.92	9.7E-03	89.1	1.46E-04	9.7E-03
14	0	0	54.08	.0239524	89.9	4.48E-05	.0239523
15	0	0	58.24	.0369693	90.1	-4.52E-05	.0369692
16	0	0	62.4	.0487083	90.1	-1.24E-04	.0487081
17	0	0	66.56	.0591257	90.2	-1.91E-04	.0591254

18	0	0	70.72	.0681804	90.2	-2.47E-04	.0681799
19	0	0	74.88	.0758349	90.2	-2.93E-04	.0758344
20	0	0	79.04	.082054	90.2	-3.28E-04	.0820534
21	0	0	83.2	.0868087	90.2	-3.54E-04	.086808
22	0	0	87.36	.0900713	90.2	-3.69E-04	.0900706
23	0	0	91.52	.0918207	90.2	-3.76E-04	.0918199
24	0	0	95.68	.0920378	90.2	-3.74E-04	.092037
25	0	0	99.84	.0907063	90.2	-3.64E-04	.0907055
26	0	0	104.	.0878127	90.2	-3.47E-04	.0878121
27	0	0	108.16	.0833445	90.2	-3.23E-04	.0833439
28	0	0	112.32	.0772845	90.2	-2.92E-04	.0772839
29	0	0	116.48	.0696091	90.2	-2.56E-04	.0696086
30	0	0	120.64	.0602779	90.2	-2.16E-04	.0602775
31	0	0	124.8	.0492115	90.2	-1.7E-04	.0492112
32	0	0	128.96	.0362399	90.2	-1.21E-04	.0362397
33	0	0	133.12	.0209716	90.2	-6.73E-05	.0209715
END	0	0	137.28	0	0	0	0