Holland & Knight

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June 17, 2011

CHARLES R. NAFTALIN
202-457-7040
Internet Address:
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VIA UPS OVERNIGHT

Marlene H. Dortch, Esq.
Secretary
Federal Communications Commission
Media Bureau Services
c/o U.S. Bank
Government Lockbox #979089
SL-MO-C2-GL
1005 Convention Plaza
St. Louis, MO 63197-9000
Attn: FCC Government Lockbox

Re: KVVN(AM), Santa Clara, California, Facility ID No. 28438
Application for License and AM Directional Antenna

Dear Ms. Dortch:

Transmitted herewith, on behalf of Urban Radio III, L.L.C., the licensee of standard broadcast station KVVN(AM), Santa Clara, California, are an original and two (2) copies of its FCC Form 302-AM, Application for a License and Directional Antenna. Also enclosed is a completed FCC Form 159 and a check issued to the FCC in the amount of $1,320.00 in payment of the filing fee. An application for an AM license, such as this, remains a paper application.

An extra copy of the filing is enclosed. Please date-stamp the extra copy and return it to us via the enclosed, prepaid, delivery envelop.

In the event there are any questions concerning this matter, please contact the undersigned.

Respectfully submitted,

HOLLAND & KNIGHT LLP

Charles R. Naftalin
Counsel for Urban Radio III, L.L.C.

Enclosures

ORIGINAL

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. BAMH-20060620AIE

SECTION I - APPLICANT FEE INFORMATION

1. PAYOR NAME (Last, First, Middle Initial)
HOLLAND & KNIGHT LLP

MAILING ADDRESS (Line 1) (Maximum 35 characters)
2099 PENNSYLVANIA AVENUE, N.W.,

MAILING ADDRESS (Line 2) (Maximum 35 characters)
SUITE 100

CITY	STATE OR COUNTRY (if foreign address)	ZIP CODE
WASHINGTON	D.C.	20006

TELEPHONE NUMBER (include area code)	CALL LETTERS	OTHER FCC IDENTIFIER (If applicable)
202-*955-3000	KVVN (AM)	28438

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
M M R	0 0 0 1	$ 615.00	

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

(A)	(B)	(C)	FOR FCC USE ONLY
M O R	0 0 0 1	$ 705.00	

	TOTAL AMOUNT REMITTED WITH THIS APPLICATION	FOR FCC USE ONLY
ADD ALL AMOUNTS SHOWN IN COLUMN C, AND ENTER THE TOTAL HERE. THIS AMOUNT SHOULD EQUAL YOUR ENCLOSED REMITTANCE.	$ 1320.00	

SECTION II - APPLICANT INFORMATION		
1. NAME OF APPLICANT URBAN RADIO III, L.L.C.		
MAILING ADDRESS C/O HOLLAND & KNIGHT LLP		
CITY WASHINGTON	STATE D.C.	ZIP CODE 20006

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
KVVN	SANTA CLARA, CA	N/A - MoM VERIFICATION	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? ☐ Yes ☑ No

If No, explain in an Exhibit. Exhibit No. ENG STMT

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. ENG STMT

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. ENG STMT

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	
LOIS E. WRIGHT		
Title	Date	Telephone Number
EXECUTIVE VICE PRESIDENT	JUNE 16, 2011	(212) 592-0408

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
Urban Radio III, LLC

PURPOSE OF AUTHORIZATION APPLIED FOR: (check one)

[X] Station License
MoM Verification

[ ] 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
KVVN	N/A	1430	Unlimited	2.5	1.0

2. Station location	
State	City or Town
California	Santa Clara

3. Transmitter location			
State	County	City or Town	Street address (or other identification)
CA	Santa Clara	San Jose	on Coyote Creek Trail off of Remillard Court

4. Main studio location			
State	County	City or Town	Street address (or other identification)
CA	Santa Clara	San Jose	1125 E. Santa Clara

5. Remote control point location (specify only if authorized directional antenna)			
State	County	City or Town	Street address (or other identification)
CA	Santa Clara	San Jose	1125 E. Santa Clara

6. Has type-approved stereo generating equipment been installed? [ ] Yes [X] No

7. Does the sampling system meet the requirements of 47 C.F.R. Section 73.68? [X] Yes [ ] No

[ ] Not Applicable

Attach as an Exhibit a detailed description of the sampling system as installed.

Exhibit No. Eng. Stmt

8. Operating constants:	
RF common point or antenna current (in amperes) without modulation for night system 7.35	RF common point or antenna current (in amperes) without modulation for day system 4.65
Measured antenna or common point resistance (in ohms) at operating frequency Night 50 Day 50	Measured antenna or common point reactance (in ohms) at operating frequency Night -11.4 Day -11.4

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	+45.7	+35.5	0.143	0.058		
2	-139.1	-124.2	0.674	0.552		
3	0.0	0.0	1.000	1.000		
4	+137.9	+120.7	0.561	0.624		

Manufacturer and type of antenna monitor: Potomac Instruments, Model AM-19(204)

SECTION III - Page 2

9. Description of antenna system (If directional antenna is used, the information requested below should be given for each element of the array. Use separate sheets if necessary.)

Type Radiator	Overall height in meters of radiator above base insulator, or above base, if grounded.	Overall height in meters above ground (without obstruction lighting)	Overall height in meters above ground (include obstruction lighting)	If antenna is either top loaded or sectionalized, describe fully in an Exhibit.
Uniform cross-section, guyed, steel	59.4	60.0	60.0	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	°	'	"
	37	19	47		121	51	58

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. N/A

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

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)	Signature
Carl T. Jones, Jr.	
Address (include ZIP Code)	Date
Carl T. Jones Corporation 7901 Yarnwood Court Springfield, VA 22153	June 14, 2011 Telephone No. (Include Area Code) (703) 569-7704

☐ Technical Director ☒ Registered Professional Engineer

☐ Chief Operator ☐ Technical Consultant

☐ Other (specify)

ENGINEERING EXHIBIT
IN SUPPORT OF AN
APPLICATION FOR LICENSE
KVVN(AM) - SANTA CLARA, CALIFORNIA
1430 kHz - 1.0 kW DAY, 2.5 kW NIGHT, U, DA-2
Facility ID:28438

Applicant: Urban Radio III, LLC

June, 2011

TABLE OF CONTENTS

Consulting Engineers
CTJC
CARL T. JONES CORPORATION

Consulting Engineers
CTJC
CARL T. JONES CORPORATION

ENGINEERING STATEMENT OF CARL T. JONES, JR., P.E.
IN SUPPORT OF
AN APPLICATION FOR STATION LICENSE
STATION KVVN(AM) – SANTA CLARA, CALIFORNIA
1430 kHz, 1.0 kW Day, 2.5 kW Night, DA-2, U
Facility ID: 28438

Applicant: Urban Radio III, L.L.C.

I am a Consulting Engineer, president in the firm 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 Urban Radio III, L.L.C. ("Urban Radio"), licensee of AM Station KVVN(AM), to prepare this engineering statement and the associated figures and appendices in support of an Application for License. Computer modeling and sample system verification techniques, as described in Section 47 CFR 73.151(c) of the Commissions Rules and Regulations, were employed to verify performance of the KVVN daytime and nighttime directional antenna systems. The specific measurement and modeling techniques used in performing the proof of performance on the KVVN directional patterns are described in detail in this engineering statement. Impedance measurement data, sample system verification measurement data, and model derived operating parameters are tabulated in the figures attached to this engineering statement. Finally, all pertinent computer model input and output files are contained in the attached Appendices A, B, and C.

2.0 IMPEDANCE MEASUREMENTS, COMPUTER MODELING AND SAMPLE SYSTEM VERIFICATION

The KVVN antenna array consists of four identical, triangular, uniform cross-section, guyed, series-fed towers having a face width of 18 inches. The height of each tower is 102.1 electrical degrees (59.4 meters). The sample system utilizes identical toroidal current transformers located at the base of each tower on the tower side of the KLIV filter network. This location corresponds to the input to the tower feed line.

A detailed description of the impedance measurements, the computer models employed, and the sample system verification measurements, is contained below.

2.1 INDIVIDUAL TOWER IMPEDANCE MEASUREMENTS

Impedance measurements were performed at the base of each tower, by the undersigned, at the Antenna Tuning Unit ("ATU") output J-Plug that is located adjacent to the sampling system toroidal current transformer. The impedance measurements were performed using a Hewlett-Packard, Model 4396A, network analyzer; an Amplifier Research Model 5W1000 power amplifier; and a Tunwall Radio directional coupler. The impedance was measured for each tower in the array with the other three towers open circuited with respect to ground at the same J-Plug location. The measured impedances are tabulated in Figure 2.

2.2 INDIVIDUAL TOWER COMPUTER MODELS

A Method of Moments ("MoM") computer model was developed to model each element in the KVVN array using Expert MiniNEC Broadcast Professional (Version 23.0). A wire model was developed for each tower in the array consisting of 21 segments.

To replicate the individual measured base impedances to within FCC specified tolerances, each tower's physical height was adjusted in the MiniNEC model and series inductances were employed in a separate circuit model. No shunt capacitances were employed in the MiniNEC or circuit models. The actual equivalent physical radius was

used in all computer models contained in this application. Details of the modeled individual tower adjusted heights are contained in Figure 1. The lumped series inductances used in the circuit model are contained in Figure 2. A comparison of the measured individual tower impedances, the modeled individual tower impedances and the adjusted modeled (circuit model) individual tower impedances is also contained in Figure 2. The adjusted tower height percentage change and the magnitude of the lumped series inductances and shunt capacitances are all within the corresponding tolerances set forth in the Rules.

As demonstrated by the data contained in Figure 2, the adjusted modeled individual tower resistances and reactances are well within ±2 ohms and ±4 percent of the respective measured individual tower resistances and reactances. The text files containing all necessary input and output data associated with the individual tower models are contained in Appendix A.

2.3 DIRECTIONAL ANTENNA COMPUTER MODELS AND ANTENNA MONITOR PARAMETERS

The theoretical directional antenna field parameters were used in combination with the individual tower computer models to produce the daytime and nighttime directional antenna computer models. From the computer model for each pattern, tower currents were derived that, when numerically integrated and normalized to the appropriate reference tower, are essentially identical to the authorized relative field parameters of each theoretical directional antenna pattern. As determined at the base of each tower model, the daytime and nighttime modeled relative antenna monitor parameters are tabulated in Figure 3. The text files containing all pertinent input and output data associated with the daytime and nighttime directional antenna computer models are contained in Appendices B and C, respectively.

2.4 SAMPLE SYSTEM DESCRIPTION AND VERIFICATION MEASURMENTS

The KVVN antenna sampling system is comprised of: 1) identical Delta Electronics, Model TCT-3, toroidal current transformers mounted on the tower side of the KLIV filter networks, corresponding to the input to the tower feed line; 2) Cablewave Systems, Type FLC38-50J, 3/8-inch, phase stabilized, foam dielectric, coaxial cable between each ATU building and the transmitter building; 3) short lengths of Andrew Corporation, Type FSJ2-50, 3/8-inch, superflex, foam dielectric, coaxial cable connecting the Cablewave Systems sample line to the antenna monitor for towers #2, #3 and #4 only; and 4) a Potomac Instruments, Model AM-19 (204) antenna monitor. The sample lines between each ATU building and the transmitter building, including excess lengths of line, are buried to a depth of 30 inches; therefore, each sample line is subjected to the same environmental conditions.

Initial measurement of the sample line lengths revealed that the tower #1 sample line was approximately 6 degrees longer than the other three sample lines. In order to achieve a maximum length variation of no more than 1 electrical degree, short lengths of Andrew Corporation, Type FSJ2-50, superflex, coaxial cable were cut and inserted between the transmitter building end of the existing sample lines and the antenna monitor, for towers #2, #3 and #4.

The sample lines, including the short lengths of superflex line were verified to be equal in length by measuring the open-circuit series resonate frequency closest to the carrier frequency. The characteristic impedance was verified by measuring the impedance at frequencies corresponding to odd multiples of 1/8 wavelength immediately above and below the open circuit series resonant frequency closest to the carrier frequency, while the line was open circuited at the sample element end of the line. The characteristic impedance was calculated by the following formula:

$$Z = \sqrt{\sqrt{R_1^2 + X_1^2} \times \sqrt{R_2^2 + X_2^2}}$$

where: Z = Characteristic impedance and

$R_1 + X_1$ and $R_2 + X_2$ are the measured impedances at 45 degree offset frequencies.

A tabulation of the measured sample line lengths and characteristic impedances is contained in Figure 4. All sample line verification measurements were performed by the undersigned using a Hewlett-Packard, Model 4396A, network analyzer; an Amplifier Research Model 5W1000 power amplifier; and a Tunwall Radio directional coupler. As demonstrated by the measured values in Figure 4, the measured sample line lengths are within 1 electrical degree of each other and the measured characteristic impedances are within 2 Ohms of each other as required by Section CFR73.151(c)(2)(i) of the FCC's Rules and Regulations.

An impedance measurement was performed at the input to each sample line, at the antenna monitor end of the line, with the sample current transformer connected. The measurement was performed at the KVVN operating frequency of 1430 kHz. The measured sample line impedances with the current transformers connected are tabulated in Figure 4 under the heading, "Reference Impedance Sample Transformer Connected".

The performance of the sampling system toroidal current transformers was verified by driving a common reference current through all four transformers and comparing their outputs against one another as observed on the Potomac Instruments Model AM-19 antenna monitor. Based on the test results, the transformer performance was determined to be well within the manufacturer's stated accuracy. A tabulation of the toroidal current transformer measurement data and the serial number of each toroidal current transformer is included in Figure 5.

The phase monitor that is employed at KVVN is a Potomac Instruments, Model AM-19 (204), Serial Number 309. The monitor was calibrated by the manufacturer in December, 2010, just prior to the performance of the sample system verification measurements contained herein.

3.0 COMMON POINT IMPEDANCE AND COMMON POINT CURRENT

The networks associated with the daytime and nighttime directional antenna systems were adjusted for proper impedance transformation and the common point impedance matching networks were set for Z = 50 – j11.4 ohms. The transmitter output power level was adjusted for a daytime common point current of 4.65 amperes and a nighttime common point current of 7.35 amperes, corresponding to daytime and nighttime input powers of 1,080 Watts and 2,700 Watts, respectively.

4.0 REFERENCE FIELD STRENGTH MEASUREMENTS

Reference field strength measurements were performed on the 89°, 220° and 351° bearings in the daytime operating mode and the 113°, 220°, and 327° bearings in the nighttime operating mode. Three reference field strength measurements were performed on each of the selected bearings.

The measurements were performed by Mr. Paul Marks, Chief Engineer of KVVN. Mr. Marks is experienced in performing field strength measurements on AM directional patterns. Details of the field strength meter that was employed to perform the measurements are as follows: Potomac Instruments, Model FIM-41, Serial Number 1989, last calibrated by the manufacturer in June, 1998. Prior to performing the field strength measurements, the meter performance was compared against another more recently calibrated meter. Details of the reference meter are as follows: Potomac Instruments Model FIM-41, Serial Number 989, last calibrated in October, 2010. The comparison was performed at several different full scales settings and the measured field strengths were found to agree for each full scale setting tested within the manufacturer's stated accuracy.

The measured field strength value for each established reference point location is tabulated in Figure 6, Sheets 1 through 3. The tabulations contained in Figure 6 also include GPS coordinates (NAD83), distance from the KVVN array center, and descriptions for each reference point location.

5.0 SUMMARY

It is submitted that the KVVN daytime and nighttime directional antenna systems have been adjusted to conform to the technical specifications contained in the station's FCC Authorization. The daytime and nighttime pattern performance has been verified using computer modeling and sample system verification procedures in accordance with Section 47 CFR 73.151(c). It is believed that daytime and nighttime antenna systems, as adjusted, 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 Urban Radio reflecting the new model derived daytime and nighttime operating parameters as contained herein.

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

Dated: June 14, 2011

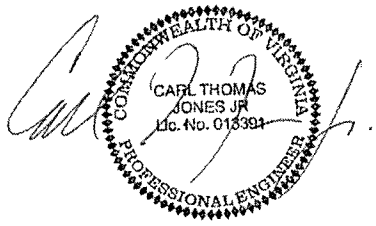

Figure 1

TOWER MODEL HEIGHT AND RADIUS

STATION KVVN - SANTA CLARA, CALIFORNIA
1430 kHz - 1.0 kW DAY, 2.5kW NIGHT, DA-2, U
JUNE, 2011

Tower	Physical Height (degrees)	Modeled Height (degrees)	Percent of Physical Height	Modeled Radius	Percent of Equivalent Radius
1	102.1	108.2	106.0	0.2183	100.0
2	102.1	103.1	101.0	0.2183	100.0
3	102.1	105.2	103.0	0.2183	100.0
4	102.1	107.7	105.5	0.2183	100.0

Figure 2

MEASURED AND MODELED IMPEDANCES

STATION KVVN - SANTA CLARA, CALIFORNIA
1430 kHz - 1.0 kW DAY, 2.5 kW NIGHT, DA-2, U
JUNE, 2011

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	83.7 +j 169.8	83.9 +j 126.0	0.0	83.9 +j 126.0	4.9	83.9 +j 170.0
2	63.9 +j 162.8	64.7 +j 94.3	0.0	64.7 +j 94.3	7.6	64.7 +j 162.6
3	71.8 +j 168.5	70.9 +j 107.2	0.0	70.9 +j 107.2	6.8	70.9 +j 168.3
4	81.2 +j 160.7	81.5 +j 122.8	0.0	81.5 +j 122.8	4.2	81.5 +j 160.5

[1] Measured at output of matching/filter networks with other towers open-circuited

Figure 3

ANTENNA MONITOR PARAMETERS AND COMMON POINT DATA

STATION KVVN - SANTA CLARA, CALIFORNIA
1430 kHz - 1.0 kW-D, 2.5 kW-N, U, DA-2
JUNE, 2011

DAYTIME		
Tower	**Ratio**	**Phase (deg)**
1	0.058	35.5
2	0.552	-124.2
3	1.000	0.0
4	0.624	120.7
Common Point Impedance = 50 -j 11.4 Ohms Common Point Current = 4.65 Amperes Antenna Input Power = 1,080 Watts		

NIGHTTIME		
Tower	**Ratio**	**Phase (deg)**
1	0.143	45.7
2	0.674	-139.1
3	1.000	0.0
4	0.561	137.9
Common Point Impedance = 50 -j 11.4 Ohms Common Point Current = 7.35 Amperes Antenna Input Power = 2,700 Watts		

SAMPLE LINE VERIFICATION MEASUREMENTS

STATION KVVN - SANTA CLARA, CALIFORNIA
1430 kHz - 1.0 kW DAY, 2.5 kW NIGHT, U, DA-2
JUNE, 2011

Tower	Open Circuit Series Resonant Frequency[1] (kHz)	Open Circuit Measured Line Length[2] (degrees)	Resonant Frequency -45 degree Offset Frequency (kHz)	Resonant Frequency -45 degree Offset Impedance (Ohms)	Resonant Frequency +45 degree Offset Frequency (kHz)	Resonant Frequency +45 degree Offset Impedance (Ohms)	Calculated Characteristic Impedance (Ohms)	Reference Impedance Sample Current Transformer Connected[2] (Ohms)
1	1520.400	423.244	1368.360	9.03 -j 49.83	1672.440	11.97 +j 51.55	51.77	54.43 -j 3.32
2	1518.250	423.843	1366.425	8.21 -j 49.09	1670.075	10.36 +j 49.66	50.25	50.56 -j 2.25
3	1518.380	423.807	1366.542	8.28 -j 49.23	1670.218	10.28 +j 49.52	50.25	52.04 -j 0.66
4	1518.350	423.815	1366.515	8.16 -j 48.83	1670.185	10.22 +j 49.29	49.92	50.66 -j 1.45

[1] At this frequency, the sample line electrical length is equal to 450°.
[2] At carrier frequency (1430 kHz)

1520.4 -45 = 1475
1520.4 +45 = 1565

1475

Figure 4

Figure 5

SAMPLE DEVICE VERIFICATION

STATION KVVN - SANTA CLARA, CALIFORNIA
1430 kHz - 1.0 kW-D, 2.5 kW-N, U, DA-2
JUNE, 2011

Reference Sample Toroid Number	Measured Sample Toroid Number	Measured	
		Field Ratio	Phase (degrees)
3	1	1.001	0.2
3	2	1.000	0.1
3	4	1.000	0.0
2	4	1.001	0.2

Sample Toroid Number	Type	Serial Number
1	Delta Electronics, TCT-3	1967
2	Delta Electronics, TCT-3	1965
3	Delta Electronics, TCT-3	1982
4	Delta Electronics, TCT-3	1962

REFERENCE FIELD STRENGTH MEASUREMENTS

STATION KVVN - SANTA CLARA, CALIFORNIA
1430 kHz - 1.0 kW DAY, 2.5 kW NIGHT, DA-2, U
JUNE, 2011

89 Degree Radial

Point Number	Distance (km)	Daytime Field (mV/m)	Nighttime Field (mV/m)	Geographic Coordinates (NAD83)		Description
				Latitude	Longitude	
1	2.06	29	___	37°19' 46.2"	121°50' 36.7"	At the south corner of Durbert Lane and Crucero Drive (corner closest to 1448 Durbert Ln.), on the curb at the wheelchair curb cut ramp.
2	3.20	16.9	___	37°19' 46.9"	121°49' 50.4"	In the middle of the sidewalk on Bermuda Way, adjacent to the school, directly across the street from the entry way to 1971 Bermuda Way.
3	3.54	11.3	___	37°19' 47.2"	121°49' 36.4"	In the southeast parking lot of Most Holy Trinity church off Nassau Drive. On the storm drain in the second aisle in from Nassau Drive

113 Degree Radial

Point Number	Distance (km)	Daytime Field (mV/m)	Nighttime Field (mV/m)	Geographic Coordinates (NAD83)		Description
				Latitude	Longitude	
1	1.80	___	16	37°19' 22.4"	121°50' 53"	At the east corner of Phelan Ave and Grenadine Way (the corner closest to 1806 Grenadine Way), at the curb on the wheelchair curb cut ramp.
2	2.46	___	19	37°19' 14"	121°50' 28.2"	On the side walk between driveways 1162 Dudash Court and 1168 Dudash Court
3	3.04	___	18.8	37°19' 06.5"	121°50' 06.3"	On the curb at the center of the driveway to 2316 Bikini Avenue

REFERENCE FIELD STRENGTH MEASUREMENTS

STATION KVVN - SANTA CLARA, CALIFORNIA
1430 kHz - 1.0 kW DAY, 2.5 kW NIGHT, DA-2, U
JUNE, 2011

220 Degree Radial

Point Number	Distance (km)	Daytime Field (mV/m)	Nighttime Field (mV/m)	Geographic Coordinates (NAD83)		Description
				Latitude	Longitude	
1	2.40	235	390	37° 18' 45.7"	121° 53' 03"	Tamien Clatrain Train Station parking lot east side of station (lot with entrances from Lick Ave). In the center of the last aisle of the north end of the lot (aisle nearest the station entrance), four parking spaces in from the northwest corner of the lot.
2	3.33	155	260	37° 18' 22.5"	121° 53' 27.3"	In the parking lot for the shopping center of Minnesota Ave and Bird Ave. On the "R" of the No Parking block between the first and second disabled parking spaces of the center aisle from the side of the lot closest to 1473 - 1489 Bird Ave (Fresh &Easy Store). In the lot to the north of the store.
3	3.94	142	229	37° 18' 7.5"	121° 53' 43.2"	On Lincoln Ave, on the curb aligned with the southwest corner of 1502 Lincoln Avenue building.

REFERENCE FIELD STRENGTH MEASUREMENTS

STATION KVVN - SANTA CLARA, CALIFORNIA
1430 kHz - 1.0 kW DAY, 2.5 kW NIGHT, DA-2, U
JUNE, 2011

327 Degree Radial

Point Number	Distance (km)	Daytime Field (mV/m)	Nighttime Field (mV/m)	Geographic Coordinates (NAD83)		Description
				Latitude	Longitude	
1	3.94	___	6	37°21' 32.2"	121°53' 27.7"	In the parking lot of the gas station/tire shop at 899 N 13th Street (at the corner of E Heading and N 13th Street), on the monitoring well cover south of the fuel pumps.
2	6.02	___	12.3	37°22' 28.2"	121°54' 13.8"	In the street at the center of the cul-de-sac circle at the end of Junction Court
3	6.63	___	5.4	37°22' 44.9"	121°54' 27.3"	In the center of Fry's Electronics (corner of Junction Ave and E Brokaw Rd) loading dock lot (southwest side of building), on the manhole cover grate.

351 Degree Radial

Point Number	Distance (km)	Daytime Field (mV/m)	Nighttime Field (mV/m)	Geographic Coordinates (NAD83)		Description
				Latitude	Longitude	
1	2.50	9.2	___	37°21' 05"	121°52' 16.2"	On Peruka Place, on the curb in the center of the driveway (near the corner of Peruka Place and E Julian Street) to the parking lot for 1175 E Julian Street.
2	5.31	4.5	___	37°22' 34.6"	121°52' 34.1"	On the curb at the edge of the driveway close to the mailbox of 1681 Hiltibrand Drive
3	6.13	5.1	___	37°23' 01"	121°52' 39.4"	On the curb at the edge of the driveway closest to the property line of 1405 Braebridge Road.

APPENDIX A

INDIVIDUAL TOWER MODELING

Consulting Engineers
CTJC
CARL T. JONES CORPORATION

IMPEDANCE - TOWER 1
normalization = 50.

freq (MHz)	resist (ohms)	react (ohms)	imped (ohms)	phase (deg)	VSWR	S11 dB	S12 dB
source = 1; node 1, sector 1							
1.43	83.863	125.97	151.33	56.3	5.8881	-2.9792	-3.0417

GEOMETRY- TOWER 1
Wire coordinates in degrees; other dimensions in meters
Environment: perfect ground

wire	caps	Distance	Angle	Z	radius	segs
1	none	0	0	0	.2183	21
		0	0	108.2		
2	none	90.	40.	0	.2183	21
		90.	40.	103.1		
3	none	180.	40.	0	.2183	21
		180.	40.	105.2		
4	none	270.	40.	0	.2183	21
		270.	40.	107.7		

ELECTRICAL DESCRIPTION - TOWER 1
Frequencies (MHz)

no.	frequency lowest	step	no. of steps	segment length (wavelengths) minimum	maximum
1	1.43	0	1	.0136376	.0143122

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	1.E-03	0	0	0	0
2	22	1.E-03	-10,000.	0	0	0
3	43	1.E-03	-10,000.	0	0	0
4	64	1.E-03	-10,000.	0	0	0

IMPEDANCE - TOWER 2
normalization = 50.

freq (MHz)	resist (ohms)	react (ohms)	imped (ohms)	phase (deg)	VSWR	S11 dB	S12 dB
source = 1; node 22, sector 1							
1.43	64.703	94.31	114.37	55.5	4.5986	-3.8389	-2.3148

GEOMETRY - TOWER 2
Wire coordinates in degrees; other dimensions in meters
Environment: perfect ground

wire	caps	Distance	Angle	Z	radius	segs
1	none	0	0	0	.2183	21
		0	0	108.2		
2	none	90.	40.	0	.2183	21
		90.	40.	103.1		
3	none	180.	40.	0	.2183	21
		180.	40.	105.2		
4	none	270.	40.	0	.2183	21
		270.	40.	107.7		

Number of wires = 4
current nodes = 84

Individual wires	minimum wire	minimum value	maximum wire	maximum value
segment length	2	4.90952	1	5.15238
radius	1	.2183	1	.2183

ELECTRICAL DESCRIPTION - TOWER 2
Frequencies (MHz)

no.	frequency lowest	step	no. of steps	segment length (wavelengths) minimum	maximum
1	1.43	0	1	.0136376	.0143122

Sources

source	node	sector	magnitude	phase	type
1	22	1	1.	0	voltage

Lumped loads

load	node	resistance (ohms)	reactance (ohms)	inductance (mH)	capacitance (uF)	passive circuit
1	1	1.E-03	-10,000.	0	0	0
2	22	1.E-03	0	0	0	0
3	43	1.E-03	-10,000.	0	0	0
4	64	1.E-03	-10,000.	0	0	0

IMPEDANCE - TOWER 3
normalization = 50.

freq (MHz)	resist (ohms)	react (ohms)	imped (ohms)	phase (deg)	VSWR	S11 dB	S12 dB
source = 1; node 43, sector 1							
1.43	70.946	107.2	128.55	56.5	5.17	-3.403	-2.6502

GEOMETRY - TOWER 3
Wire coordinates in degrees; other dimensions in meters
Environment: perfect ground

wire	caps	Distance	Angle	Z	radius	segs
1	none	0	0	0	.2183	21
		0	0	108.2		
2	none	90.	40.	0	.2183	21
		90.	40.	103.1		
3	none	180.	40.	0	.2183	21
		180.	40.	105.2		
4	none	270.	40.	0	.2183	21
		270.	40.	107.7		

Number of wires = 4
current nodes = 84

Individual wires	minimum wire	minimum value	maximum wire	maximum value
segment length	2	4.90952	1	5.15238
radius	1	.2183	1	.2183

ELECTRICAL DESCRIPTION - TOWER 3
Frequencies (MHz)

no.	frequency lowest	step	no. of steps	segment length (wavelengths) minimum	maximum
1	1.43	0	1	.0136376	.0143122

Sources

source	node	sector	magnitude	phase	type
1	43	1	1.	0	voltage

Lumped loads

load	node	resistance (ohms)	reactance (ohms)	inductance (mH)	capacitance (uF)	passive circuit
1	1	1.E-03	-10,000.	0	0	0
2	22	1.E-03	-10,000.	0	0	0
3	43	1.E-03	0	0	0	0
4	64	1.E-03	-10,000.	0	0	0

IMPEDANCE - TOWER 4
normalization = 50.

freq (MHz)	resist (ohms)	react (ohms)	imped (ohms)	phase (deg)	VSWR	S11 dB	S12 dB
source = 1; node 64, sector 1							
1.43	81.515	122.81	147.4	56.4	5.7706	-3.0411	-2.9797

GEOMETRY - TOWER 4
Wire coordinates in degrees; other dimensions in meters
Environment: perfect ground

wire	caps	Distance	Angle	Z	radius	segs
1	none	0	0	0	.2183	21
		0	0	108.2		
2	none	90.	40.	0	.2183	21
		90.	40.	103.1		
3	none	180.	40.	0	.2183	21
		180.	40.	105.2		
4	none	270.	40.	0	.2183	21
		270.	40.	107.7		

Number of wires = 4
current nodes = 84

Individual wires	minimum wire	minimum value	maximum wire	maximum value
segment length	2	4.90952	1	5.15238
radius	1	.2183	1	.2183

ELECTRICAL DESCRIPTION - TOWER 4
Frequencies (MHz)

no.	frequency lowest	step	no. of steps	segment length (wavelengths) minimum	maximum
1	1.43	0	1	.0136376	.0143122

Sources

source	node	sector	magnitude	phase	type
1	64	1	1.	0	voltage

Lumped loads

load	node	resistance (ohms)	reactance (ohms)	inductance (mH)	capacitance (uF)	passive circuit
1	1	1.E-03	-10,000.	0	0	0
2	22	1.E-03	-10,000.	0	0	0
3	43	1.E-03	-10,000.	0	0	0
4	64	1.E-03	0	0	0	0

APPENDIX B

DAYTIME
DIRECTIONAL ARRAY MODEL

Consulting Engineers
CTJC
CARL T. JONES CORPORATION

IMPEDANCE - DAYTIME
normalization = 50.

freq (MHz)	resist (ohms)	react (ohms)	imped (ohms)	phase (deg)	VSWR	S11 dB	S12 dB
source = 1; node 1, sector 1							
1.43	-1,258.4	-6.1395	1,258.4	180.3	****	****	****
source = 2; node 22, sector 1							
1.43	60.151	215.17	223.42	74.4	17.371	-1.0011	-6.8639
source = 3; node 43, sector 1							
1.43	57.637	131.52	143.59	66.3	7.8957	-2.212	-3.9891
source = 4; node 64, sector 1							
1.43	29.313	100.4	104.59	73.7	9.0589	-1.9255	-4.4597

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

wire	caps	Distance	Angle	Z	radius	segs
1	none	0	0	0	.2183	21
		0	0	108.2		
2	none	90.	40.	0	.2183	21
		90.	40.	103.1		
3	none	180.	40.	0	.2183	21
		180.	40.	105.2		
4	none	270.	40.	0	.2183	21
		270.	40.	107.7		

Number of wires = 4
current nodes = 84

	minimum wire	minimum value	maximum wire	maximum value
Individual wires segment length	2	4.90952	1	5.15238
radius	1	.2183	1	.2183

MEDIUM WAVE ARRAY SYNTHESIS FROM FIELD RATIOS - DAYTIME

Frequency = 1.43 MHz

tower	field ratio magnitude	phase (deg)
1	.1429	113.1
2	.6186	-123.6
3	1.	0
4	.6014	123.3

VOLTAGES AND CURRENTS - peak

source node	voltage magnitude	phase (deg)	current magnitude	phase (deg)
1	355.87	221.7	.28279	41.4
22	604.576	316.	2.70595	241.7
43	704.13	72.2	4.90362	5.9
64	319.931	200.4	3.05891	126.6

Sum of square of source currents = 40.8046
Total power = 1,000. watts

TOWER ADMITTANCE MATRIX

admittance	real (mhos)	imaginary (mhos)
Y(1, 1)	.0035795	-.00464409
Y(1, 2)	.00262278	.0012067
Y(1, 3)	.000624514	-.000652906
Y(1, 4)	-.000231363	-.000239476
Y(2, 1)	.00262277	.00120677
Y(2, 2)	.00445409	-.00488805
Y(2, 3)	.00308105	.00166911
Y(2, 4)	.000745749	-.000716146
Y(3, 1)	.000624513	-.000652901
Y(3, 2)	.00308106	.00166908
Y(3, 3)	.00389272	-.00440743
Y(3, 4)	.0025337	.00112134
Y(4, 1)	-.000231363	-.000239472
Y(4, 2)	.000745746	-.000716157
Y(4, 3)	.0025337	.00112131
Y(4, 4)	.00371634	-.00478272

TOWER IMPEDANCE MATRIX

impedance	real (ohms)	imaginary (ohms)
Z(1, 1)	84.1043	125.928
Z(1, 2)	34.3453	-38.5999
Z(1, 3)	-25.2463	-27.3484
Z(1, 4)	-23.6125	23.4983
Z(2, 1)	34.3441	-38.6004
Z(2, 2)	65.0392	94.2741
Z(2, 3)	32.0963	-30.2589
Z(2, 4)	-23.8046	-26.2641
Z(3, 1)	-25.2464	-27.3481
Z(3, 2)	32.0967	-30.2587
Z(3, 3)	71.2872	107.159
Z(3, 4)	35.2096	-40.3266
Z(4, 1)	-23.6125	23.4983
Z(4, 2)	-23.8044	-26.2644
Z(4, 3)	35.2103	-40.3264
Z(4, 4)	81.7886	122.752

ELECTRICAL DESCRIPTION - DAYTIME
Frequencies (MHz)

no.	frequency lowest	step	no. of steps	segment length (wavelengths) minimum	maximum
1	1.43	0	1	.0136376	.0143122

Sources

source	node	sector	magnitude	phase	type
1	1	1	355.87	221.7	voltage
2	22	1	604.576	316.	voltage
3	43	1	704.13	72.2	voltage
4	64	1	319.931	200.4	voltage

Lumped loads

load	node	resistance (ohms)	reactance (ohms)	inductance (mH)	capacitance (uF)	passive circuit
1	1	1.E-03	0	0	0	0
2	22	1.E-03	0	0	0	0
3	43	1.E-03	0	0	0	0
4	64	1.E-03	0	0	0	0

PEAK CURRENTS - DAYTIME
Frequency = 1.43 MHz
Input power = 1,000. watts
Efficiency = 100. %
coordinates in degrees

current no.	X	Y	Z	mag (amps)	phase (deg)	real (amps)	imaginary (amps)
GND	0	0	0	.282791	41.4	.212087	.187056
2	0	0	5.15238	.357239	79.6	.0647883	.351315
3	0	0	10.3048	.45172	93.4	-.0269092	.450917
4	0	0	15.4571	.540715	101.	-.103026	.53081
5	0	0	20.6095	.618917	105.7	-.167775	.595743
6	0	0	25.7619	.684983	109.	-.222897	.647703
7	0	0	30.9143	.738407	111.4	-.269164	.687601
8	0	0	36.0667	.778953	113.2	-.306959	.715922
9	0	0	41.2191	.806517	114.7	-.336491	.732969
10	0	0	46.3714	.821073	115.8	-.357891	.738969
11	0	0	51.5238	.822667	116.8	-.37126	.73413
12	0	0	56.6762	.811406	117.7	-.376696	.718665
13	0	0	61.8286	.787455	118.4	-.374302	.692808
14	0	0	66.981	.751034	119.	-.364201	.656818
15	0	0	72.1333	.702398	119.6	-.346527	.610968
16	0	0	77.2857	.641821	120.1	-.321422	.555538
17	0	0	82.4381	.569557	120.5	-.289018	.490779
18	0	0	87.5905	.485771	120.9	-.249402	.416859
19	0	0	92.7429	.390386	121.3	-.202538	.333735
20	0	0	97.8952	.282708	121.6	-.148062	.240834
21	0	0	103.048	.160436	121.9	-.0847542	.136222
END	0	0	108.2	0	0	0	0
GND	68.944	-57.8509	0	2.70596	241.7	-1.2849	-2.38144
23	68.944	-57.8509	4.90952	3.05116	239.8	-1.53441	-2.63726
24	68.944	-57.8509	9.81905	3.24421	238.9	-1.67736	-2.77693
25	68.944	-57.8509	14.7286	3.38281	238.2	-1.7845	-2.87384
26	68.944	-57.8509	19.6381	3.47716	237.6	-1.86327	-2.93579
27	68.944	-57.8509	24.5476	3.53181	237.1	-1.91695	-2.9663
28	68.944	-57.8509	29.4571	3.5491	236.7	-1.94719	-2.96724
29	68.944	-57.8509	34.3667	3.53051	236.4	-1.95497	-2.93982
30	68.944	-57.8509	39.2762	3.47721	236.1	-1.94105	-2.88501
31	68.944	-57.8509	44.1857	3.39028	235.8	-1.90607	-2.80373

32	68.944	-57.8509	49.0952	3.27077	235.5	-1.85063	-2.69686
33	68.944	-57.8509	54.0048	3.11976	235.3	-1.77537	-2.56534
34	68.944	-57.8509	58.9143	2.93845	235.1	-1.68097	-2.41015
35	68.944	-57.8509	63.8238	2.72803	234.9	-1.56811	-2.2323
36	68.944	-57.8509	68.7333	2.48976	234.7	-1.43752	-2.03284
37	68.944	-57.8509	73.6429	2.22485	234.6	-1.28988	-1.81278
38	68.944	-57.8509	78.5524	1.93436	234.4	-1.12582	-1.57298
39	68.944	-57.8509	83.4619	1.619	234.3	-.945721	-1.31406
40	68.944	-57.8509	88.3714	1.27865	234.1	-.749517	-1.03594
41	68.944	-57.8509	93.281	.911262	234.	-.535948	-.736993
42	68.944	-57.8509	98.1905	.509834	233.8	-.300839	-.411614
END	68.944	-57.8509	103.1	0	0	0	0
GND	137.888	-115.702	0	4.90363	5.9	4.87779	.502774
44	137.888	-115.702	5.00952	5.28624	4.	5.27326	.370234
45	137.888	-115.702	10.0191	5.48965	3.	5.48219	.286108
46	137.888	-115.702	15.0286	5.62201	2.2	5.61793	.214153
47	137.888	-115.702	20.0381	5.69473	1.5	5.69274	.150624
48	137.888	-115.702	25.0476	5.71298	.9	5.71221	.0939837
49	137.888	-115.702	30.0571	5.67953	.4	5.67937	.0435795
50	137.888	-115.702	35.0667	5.59635	360.	5.59635	-8.77E-04
51	137.888	-115.702	40.0762	5.46508	359.6	5.46494	-.0395054
52	137.888	-115.702	45.0857	5.28731	359.2	5.28682	-.0723421
53	137.888	-115.702	50.0952	5.06472	358.9	5.06375	-.0993856
54	137.888	-115.702	55.1048	4.79908	358.6	4.79757	-.120621
55	137.888	-115.702	60.1143	4.49227	358.3	4.4902	-.136035
56	137.888	-115.702	65.1238	4.14627	358.	4.14371	-.145618
57	137.888	-115.702	70.1333	3.76313	357.7	3.76016	-.149374
58	137.888	-115.702	75.1429	3.3448	357.5	3.34155	-.14731
59	137.888	-115.702	80.1524	2.89308	357.2	2.88971	-.139433
60	137.888	-115.702	85.1619	2.40919	357.	2.4059	-.125726
61	137.888	-115.702	90.1714	1.89323	356.8	1.89025	-.1061
62	137.888	-115.702	95.181	1.34242	356.6	1.34002	-.0802718
63	137.888	-115.702	100.191	.7469	356.4	.745392	-.0474461
END	137.888	-115.702	105.2	0	0	0	0
GND	206.832	-173.553	0	3.05892	126.6	-1.82542	2.45455
65	206.832	-173.553	5.12857	3.2407	125.7	-1.88907	2.63316
66	206.832	-173.553	10.2571	3.33215	125.1	-1.91576	2.72636
67	206.832	-173.553	15.3857	3.38519	124.6	-1.92441	2.78498
68	206.832	-173.553	20.5143	3.40551	124.3	-1.91719	2.81458
69	206.832	-173.553	25.6429	3.39575	123.9	-1.89516	2.81771
70	206.832	-173.553	30.7714	3.35742	123.6	-1.85902	2.79576
71	206.832	-173.553	35.9	3.29162	123.3	-1.80934	2.74973
72	206.832	-173.553	41.0286	3.19935	123.1	-1.74667	2.68048
73	206.832	-173.553	46.1571	3.08162	122.9	-1.6716	2.58885
74	206.832	-173.553	51.2857	2.9395	122.6	-1.58476	2.47572
75	206.832	-173.553	56.4143	2.77408	122.4	-1.4868	2.34199
76	206.832	-173.553	61.5429	2.58658	122.2	-1.37845	2.18866
77	206.832	-173.553	66.6714	2.37824	122.	-1.26044	2.01676
78	206.832	-173.553	71.8	2.15037	121.8	-1.13353	1.82734
79	206.832	-173.553	76.9286	1.9042	121.6	-.998464	1.62143
80	206.832	-173.553	82.0571	1.6409	121.4	-.855921	1.39998
81	206.832	-173.553	87.1857	1.36131	121.3	-.706427	1.16367
82	206.832	-173.553	92.3143	1.06567	121.1	-.550175	.912663
83	206.832	-173.553	97.4429	.752593	120.9	-.386555	.645733
84	206.832	-173.553	102.571	.416782	120.7	-.212958	.358268
END	206.832	-173.553	107.7	0	0	0	0

APPENDIX C

NIGHTTIME
DIRECTIONAL ARRAY MODEL

Consulting Engineers
CTJC
CARL T. JONES CORPORATION

IMPEDANCE - NIGHTTIME
normalization = 50.

freq (MHz)	resist (ohms)	react (ohms)	imped (ohms)	phase (deg)	VSWR	S11 dB	S12 dB
source = 1; node 1, sector 1							
1.43	-411.8	217.63	465.77	152.1	****	****	****
source = 2; node 22, sector 1							
1.43	26.394	183.91	185.79	81.8	28.016	-.62033	-8.7581
source = 3; node 43, sector 1							
1.43	42.385	133.16	139.74	72.3	10.297	-1.6925	-4.9114
source = 4; node 64, sector 1							
1.43	21.116	107.48	109.53	78.9	13.659	-1.2741	-5.9472

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

wire	caps	Distance	Angle	Z	radius	segs
1	none	0	0	0	.2183	21
		0	0	108.2		
2	none	90.	40.	0	.2183	21
		90.	40.	103.1		
3	none	180.	40.	0	.2183	21
		180.	40.	105.2		
4	none	270.	40.	0	.2183	21
		270.	40.	107.7		

Number of wires = 4
current nodes = 84

	minimum wire	minimum value	maximum wire	maximum value
Individual wires segment length	2	4.90952	1	5.15238
radius	1	.2183	1	.2183

MEDIUM WAVE ARRAY SYNTHESIS FROM FIELD RATIOS - NIGHTTIME

Frequency = 1.43 MHz

tower	field ratio magnitude	phase (deg)
1	.202	83.
2	.7172	-137.2
3	1.	0
4	.5475	139.8

VOLTAGES AND CURRENTS - peak

source node	voltage magnitude	phase (deg)	current magnitude	phase (deg)
1	647.898	202.2	1.39102	50.
22	1,220.89	307.1	6.57117	225.2
43	1,361.8	76.7	9.74535	4.3
64	599.133	221.1	5.46979	142.2

Sum of square of source currents = 170.006
Total power = 2,500. watts

TOWER ADMITTANCE MATRIX

admittance	real (mhos)	imaginary (mhos)
Y(1, 1)	.0035795	-.00464409
Y(1, 2)	.00262278	.0012067
Y(1, 3)	.000624514	-.000652906
Y(1, 4)	-.000231363	-.000239476
Y(2, 1)	.00262277	.00120677
Y(2, 2)	.00445409	-.00488805
Y(2, 3)	.00308105	.00166911
Y(2, 4)	.000745749	-.000716146
Y(3, 1)	.000624513	-.000652901
Y(3, 2)	.00308106	.00166908
Y(3, 3)	.00389272	-.00440743
Y(3, 4)	.0025337	.00112134
Y(4, 1)	-.000231363	-.000239472
Y(4, 2)	.000745746	-.000716157
Y(4, 3)	.0025337	.00112131
Y(4, 4)	.00371634	-.00478272

TOWER IMPEDANCE MATRIX

impedance	real (ohms)	imaginary (ohms)
Z(1, 1)	84.1043	125.928
Z(1, 2)	34.3453	-38.5999
Z(1, 3)	-25.2463	-27.3484
Z(1, 4)	-23.6125	23.4983
Z(2, 1)	34.3441	-38.6004
Z(2, 2)	65.0392	94.2741
Z(2, 3)	32.0963	-30.2589
Z(2, 4)	-23.8046	-26.2641
Z(3, 1)	-25.2464	-27.3481
Z(3, 2)	32.0967	-30.2587
Z(3, 3)	71.2872	107.159
Z(3, 4)	35.2096	-40.3266
Z(4, 1)	-23.6125	23.4983
Z(4, 2)	-23.8044	-26.2644
Z(4, 3)	35.2103	-40.3264
Z(4, 4)	81.7886	122.752

ELECTRICAL DESCRIPTION - NIGHTTIME
Frequencies (MHz)

no.	frequency lowest	step	no. of steps	segment length (wavelengths) minimum	maximum
1	1.43	0	1	.0136376	.0143122

Sources

source	node	sector	magnitude	phase	type
1	1	1	647.898	202.2	voltage
2	22	1	1,220.89	307.1	voltage
3	43	1	1,361.8	76.7	voltage
4	64	1	599.133	221.1	voltage

Lumped loads

load	node	resistance (ohms)	reactance (ohms)	inductance (mH)	capacitance (uF)	passive circuit
1	1	1.E-03	0	0	0	0
2	22	1.E-03	0	0	0	0
3	43	1.E-03	0	0	0	0
4	64	1.E-03	0	0	0	0

PEAK CURRENTS - NIGHTTIME
Frequency = 1.43 MHz
Input power = 2,500. watts
Efficiency = 100. %
coordinates in degrees

current no.	X	Y	Z	mag (amps)	phase (deg)	real (amps)	imaginary (amps)
GND	0	0	0	1.39102	50.	.893748	1.0659
2	0	0	5.15238	1.61438	62.7	.739713	1.43493
3	0	0	10.3048	1.7735	68.9	.639271	1.65428
4	0	0	15.4571	1.90687	73.2	.551133	1.82548
5	0	0	20.6095	2.01515	76.5	.471011	1.95933
6	0	0	25.7619	2.09835	79.1	.397199	2.06041
7	0	0	30.9143	2.15615	81.2	.329014	2.1309
8	0	0	36.0667	2.18829	83.	.266201	2.17203
9	0	0	41.2191	2.19462	84.5	.208709	2.18467
10	0	0	46.3714	2.17516	85.9	.156592	2.16951
11	0	0	51.5238	2.13006	87.	.109954	2.12722
12	0	0	56.6762	2.05967	88.1	.0689233	2.05851
13	0	0	61.8286	1.96442	89.	.0336335	1.96413
14	0	0	66.981	1.84491	89.9	4.21E-03	1.8449
15	0	0	72.1333	1.70178	90.6	-.0192191	1.70167
16	0	0	77.2857	1.53576	91.4	-.03656	1.53532
17	0	0	82.4381	1.34747	92.	-.0477154	1.34662
18	0	0	87.5905	1.13735	92.7	-.0525912	1.13613
19	0	0	92.7429	.905263	93.2	-.051063	.903821
20	0	0	97.8952	.649707	93.8	-.0428943	.648289
21	0	0	103.048	.365569	94.3	-.0275209	.364532
END	0	0	108.2	0	0	0	0
GND	68.944	-57.8509	0	6.57119	225.2	-4.62841	-4.66459
23	68.944	-57.8509	4.90952	7.28256	224.4	-5.20314	-5.09539
24	68.944	-57.8509	9.81905	7.6719	224.	-5.5216	-5.32635
25	68.944	-57.8509	14.7286	7.94282	223.6	-5.74809	-5.48159
26	68.944	-57.8509	19.6381	8.11687	223.4	-5.90001	-5.57436
27	68.944	-57.8509	24.5476	8.2038	223.2	-5.98519	-5.61069
28	68.944	-57.8509	29.4571	8.20867	223.	-6.00765	-5.59379
29	68.944	-57.8509	34.3667	8.13486	222.8	-5.97001	-5.52584
30	68.944	-57.8509	39.2762	7.98503	222.6	-5.87431	-5.40863
31	68.944	-57.8509	44.1857	7.76166	222.5	-5.72241	-5.2438

32	68.944	-57.8509	49.0952	7.46722	222.4	-5.51615	-5.03304
33	68.944	-57.8509	54.0048	7.10428	222.3	-5.25744	-4.77809
34	68.944	-57.8509	58.9143	6.67555	222.2	-4.94828	-4.48079
35	68.944	-57.8509	63.8238	6.18386	222.1	-4.59078	-4.14305
36	68.944	-57.8509	68.7333	5.63209	222.	-4.18708	-3.76681
37	68.944	-57.8509	73.6429	5.02302	221.9	-3.73923	-3.35395
38	68.944	-57.8509	78.5524	4.35912	221.8	-3.24907	-2.90612
39	68.944	-57.8509	83.4619	3.64202	221.7	-2.7178	-2.42442
40	68.944	-57.8509	88.3714	2.87156	221.7	-2.1453	-1.9088
41	68.944	-57.8509	93.281	2.04316	221.6	-1.5281	-1.35624
42	68.944	-57.8509	98.1905	1.14128	221.5	-.854512	-.756521
END	68.944	-57.8509	103.1	0	0	0	0
GND	137.888	-115.702	0	9.74537	4.3	9.71746	.737046
44	137.888	-115.702	5.00952	10.5129	3.	10.4988	.543614
45	137.888	-115.702	10.0191	10.9191	2.2	10.911	.420724
46	137.888	-115.702	15.0286	11.1825	1.6	11.178	.315503
47	137.888	-115.702	20.0381	11.3264	1.1	11.3242	.222489
48	137.888	-115.702	25.0476	11.3614	.7	11.3605	.139449
49	137.888	-115.702	30.0571	11.2932	.3	11.293	.0654423
50	137.888	-115.702	35.0667	11.1259	0.0	11.1259	5.83E-05
51	137.888	-115.702	40.0762	10.8629	359.7	10.8627	-.0568611
52	137.888	-115.702	45.0857	10.5074	359.4	10.5069	-.105352
53	137.888	-115.702	50.0952	10.063	359.2	10.0619	-.145394
54	137.888	-115.702	55.1048	9.5331	358.9	9.53145	-.176945
55	137.888	-115.702	60.1143	8.92164	358.7	8.91939	-.19996
56	137.888	-115.702	65.1238	8.23261	358.5	8.22981	-.214406
57	137.888	-115.702	70.1333	7.47009	358.3	7.46684	-.220261
58	137.888	-115.702	75.1429	6.6381	358.1	6.63453	-.217513
59	137.888	-115.702	80.1524	5.74018	357.9	5.73648	-.206144
60	137.888	-115.702	85.1619	4.77891	357.8	4.77529	-.186104
61	137.888	-115.702	90.1714	3.7545	357.6	3.75121	-.157236
62	137.888	-115.702	95.181	2.66152	357.4	2.65885	-.119094
63	137.888	-115.702	100.191	1.48043	357.3	1.47875	-.0704712
END	137.888	-115.702	105.2	0	0	0	0
GND	206.832	-173.553	0	5.4698	142.2	-4.32109	3.35365
65	206.832	-173.553	5.12857	5.81835	141.5	-4.55224	3.62358
66	206.832	-173.553	10.2571	5.99574	141.1	-4.66481	3.76676
67	206.832	-173.553	15.3857	6.10154	140.8	-4.7256	3.85973
68	206.832	-173.553	20.5143	6.14666	140.5	-4.74203	3.91084
69	206.832	-173.553	25.6429	6.13616	140.2	-4.7176	3.92387
70	206.832	-173.553	30.7714	6.07289	140.	-4.65437	3.90088
71	206.832	-173.553	35.9	5.95896	139.8	-4.55392	3.84331
72	206.832	-173.553	41.0286	5.79624	139.7	-4.4177	3.75238
73	206.832	-173.553	46.1571	5.58658	139.5	-4.24716	3.62926
74	206.832	-173.553	51.2857	5.33194	139.3	-4.04385	3.47518
75	206.832	-173.553	56.4143	5.03439	139.2	-3.80941	3.29143
76	206.832	-173.553	61.5429	4.69615	139.	-3.54559	3.07939
77	206.832	-173.553	66.6714	4.31954	138.9	-3.25423	2.84049
78	206.832	-173.553	71.8	3.90693	138.7	-2.9372	2.57623
79	206.832	-173.553	76.9286	3.46067	138.6	-2.59634	2.28806
80	206.832	-173.553	82.0571	2.98289	138.5	-2.23335	1.97731
81	206.832	-173.553	87.1857	2.47518	138.4	-1.8495	1.64494
82	206.832	-173.553	92.3143	1.93797	138.2	-1.44521	1.29115
83	206.832	-173.553	97.4429	1.36884	138.1	-1.01877	.914236
84	206.832	-173.553	102.571	.758156	138.	-.563129	.507629
END	206.832	-173.553	107.7	0	0	0	0