Kathleen A. Kirby
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Wiley Rein LLP
1776 K Street NW
Washington, DC 20006
Tel: 202.719.7000

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March 22, 2021

VIA e-mail submission to James Bradshaw and Nazifa Sawez

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

Re: **Inspiration Media, Inc. – FRN 0001635275**
Station KGNW(AM), Burien-Seattle, WA (Fac. ID 28819)
Application for Station License

Dear Ms. Dortch:

On behalf of Inspiration Media, Inc., licensee of AM station KGNW, Burien-Seattle, WA, we are submitting an application on FCC Form 302-AM for license.

The fee due for this application, $1,560.00, has been paid, using the FCC Fee Filer system. A copy of Form 159 confirming the payment is included herewith.

Should there be any questions concerning this application, please contact the undersigned.

Respectfully submitted,

Kathleen A. Kirby

Remittance ID:3544405 Authorization Number:26RK5629
Successful Authorization -- Date Paid: 3/22/21
FILE COPY ONLY!!

READ INSTRUCTIONS CAREFULLY BEFORE PROCEEDING (1) LOCKBOX #**979089**	FEDERAL COMMUNICATIONS COMMISSION **REMITTANCE ADVICE** **FORM 159** PAGE NO 1 OF 1	APPROVED BY OMB 3060-059 SPECIAL USE FCC USE ONLY

SECTION A - Payer Information

(2) PAYER NAME (if paying by credit card, enter name exactly as it appears on your card)	(3) TOTAL AMOUNT PAID (dollars and cents)
Inspiration Media, Inc.	**$1560.00**

(4) STREET ADDRESS LINE NO. 1
4880 Santa Rosa Road

(5) STREET ADDRESS LINE NO. 2

(6) CITY	(7) STATE	(8) ZIP CODE
Camarillo	**CA**	**93012**

(9) DAYTIME TELEPHONE NUMBER (INCLUDING AREA CODE)	(10) COUNTRY CODE (IF NOT IN U.S.A.)
805-3844502	**US**

FCC REGISTRATION NUMBER (FRN) AND TAX IDENTIFICATION NUMBER (TIN) REQUIRED

(11) PAYER (FRN)	(12) FCC USE ONLY
0001635275	

IF PAYER NAME AND THE APPLICANT NAME ARE DIFFERENT, COMPLETE SECTION B
IF MORE THAN ONE APPLICANT, USE CONTINUATION SHEETS (FORM 159-C)

(13) APPLICANT NAME
Inspiration Media, Inc.

(14) STREET ADDRESS LINE NO. 1
4880 Santa Rosa Road

(15) STREET ADDRESS LINE NO. 2

(16) CITY	(17) STATE	(18) ZIP CODE
Camarillo	**CA**	**93012**

(19) DAYTIME TELEPHONE NUMBER (INCLUDING AREA CODE)	(20) COUNTRY CODE (IF NOT IN U.S.A.)
805-3844502	**US**

FCC REGISTRATION NUMBER (FRN) AND TAX IDENTIFICATION NUMBER (TIN) REQUIRED

(21) APPLICANT (FRN)	(22) FCC USE ONLY
0001635275	

COMPLETE SECTION C FOR EACH SERVICE, IF MORE BOXES ARE NEEDED, USE CONTINUATION SHEET

(23A) FCC Call Sign/Other ID	(24A) Payment Type Code(PTC)	(25A) Quantity
KGNW	**MMR**	**1**
(26A) Fee Due for (PTC)	(27A) Total Fee	FCC Use Only
$725.00	**$725.00**	
(28A) FCC CODE 1	(29A) FCC CODE 2	
28819	**Form302-AM**	

(23B) FCC Call Sign/Other ID	(24B) Payment Type Code(PTC)	(25B) Quantity
KGNW	**MOR**	**1**
(26B) Fee Due for (PTC)	(27B) Total Fee	FCC Use Only
$835.00	**$835.00**	
(28B) FCC CODE 1	(29B) FCC CODE 2	
28819	**Form302-AM**	

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)

Inspiration Media, Inc.

MAILING ADDRESS (Line 1) (Maximum 35 characters)

4880 SANTA ROSA ROAD

MAILING ADDRESS (Line 2) (Maximum 35 characters)

CITY	STATE OR COUNTRY (if foreign address)	ZIP CODE
CAMARILLO	CA	93012

TELEPHONE NUMBER (include area code)	CALL LETTERS	OTHER FCC IDENTIFIER (If applicable)
(805)987-0400	KGNW(AM)	28819

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
MMR	0001	$ 725.00	

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
MOR	0001	$ 835.00	

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
$ 1560.00	

CLEAR ALL PAGES

SECTION II - APPLICANT INFORMATION		
1. NAME OF APPLICANT Inspiration Media, Inc.		
MAILING ADDRESS 4880 SANTA ROSA ROAD		
CITY CAMARILLO	STATE CA	ZIP CODE 93012

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
KGNW	Burien-Seattle, WA	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?

☐ Yes ☐ No

If No, explain in an Exhibit. Not applicable - BMML application

Exhibit No.

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

☐ Yes ☐ No

If No, state exceptions in an Exhibit. Not applicable - BMML application

Exhibit No.

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

☐ Yes ☐ No

If Yes, explain in an Exhibit. Not applicable - BMML application

Exhibit No.

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

☐ Yes ☐ No

☑ Does not apply

If No, explain in an Exhibit.

Exhibit No.

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

☐ Yes ☑ No

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

Exhibit No.

CLEAR ALL PAGES

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

☐ Yes ☑ No

If Yes, provide particulars as an Exhibit.

Exhibit No.

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

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

CERTIFICATION

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

☑ Yes ☐ No

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

Name	Signature	
Christopher J. Henderson	Christopher Henderson	
Title	Date	Telephone Number
EXECUTIVE VICE PRESIDENT & SECRETARY	3/19/2021	(805)987-0400

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.

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ENGINEERING EXHIBIT
IN SUPPORT OF AN
APPLICATION FOR STATION LICENSE
STATION KGNW(AM) – BURIEN-SEATTLE, WASHINGTON
820 kHz – 50 kW DAY, 5.0 kW NIGHT, U, DA-2
Facility ID: 28819

Applicant: Inspiration Media, Inc.

March, 2021

Consulting Engineers
CTJC
CARL T. JONES CORPORATION

TABLE OF CONTENTS

FCC Form 301 - Section III

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

APPENDICES

SECTION III - LICENSE APPLICATION ENGINEERING DATA

Name of Applicant
Inspiration Media, Inc.

PURPOSE OF AUTHORIZATION APPLIED FOR: (check one)

☑ Station License ☐ Direct Measurement of Power

1. Facilities authorized in construction permit

Call Sign	File No. of Construction Permit (if applicable)	Frequency (kHz)	Hours of Operation	Power in kilowatts	
				Night	Day
KGNW	N/A	820	Unlimited	5.0	50.0

2. Station location

State	City or Town
Washington	Burien-Seattle

3. Transmitter location

State	County	City or Town	Street address (or other identification)
WA	King	Vashon	10426 Cemetary Road

4. Main studio location

State	County	City or Town	Street address (or other identification)
WA	King	Seattle	705 5th Avenue South Suite 350

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

State	County	City or Town	Street address (or other identification)
WA	King	Seattle	705 5th Avenue South Suite 350

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

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

Attach as an Exhibit a detailed description of the sampling system as installed. Exhibit No. See Engineering 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
10.39	32.45

Measured antenna or common point resistance (in ohms) at operating frequency		Measured antenna or common point reactance (in ohms) at operating frequency	
Night	Day	Night	Day
50.0	50.0	+j0.0	+j0.0

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(W)	-44.4	-80.0	0.547	0.517		
2(C)	0.0	0.0	1.000	1.000		
3(E)	37.1	53.2	0.516	0.527		

Manufacturer and type of antenna monitor: Potomac Instruments Model 1901-3, Serial Number 443

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.
Uniform Cross-Section, guyed, steel tower	88.8	89.3	89.9	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	47 °	26 '	00 "	West Longitude	122 °	28 '	02 "

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

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, No Change

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.

N/A

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	March 15, 2021
	Telephone No. (Include Area Code) (703) 569-7704

☐ Technical Director ☑ Registered Professional Engineer

☐ Chief Operator ☐ Technical Consultant

☐ Other (specify)

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 KGNW(AM) – BURIEN-SEATTLE, WASHINGTON
820 kHz – 50 kW DAY, 5.0 kW NIGHT, U, DA-2
Facility ID: 28819

Applicant: Inspiration Media, Inc.

I am a Consulting Engineer and president of the 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 Inspiration Media, Inc. ("IMI"), licensee of AM Radio Station KGNW, to prepare this engineering statement and the associated figures and appendices in support of an Application for License. Station KGNW is licensed to operate on 820 kHz with a daytime power of 50 kW and nighttime power of 5.0 kW, using different directional patterns for its daytime and nighttime operations (DA-2). The station uses a three-tower inline array that is also shared with collocated and diplexed station KJR.

7901 Yarnwood Court
Springfield, VA 22153-2899
tel: (703) 569-7704
fax: (703) 569-6417
email: info@ctjc.com
www.ctjc.com

Computer modeling and sample system verification techniques as described in Section 47 CFR 73.151(c) of the FCC's Rules and Regulations were used to verify the performance of the KGNW daytime and nighttime directional patterns. The specific measurement and modeling techniques used in performing the proof of performance on the KGNW directional patterns are described in detail in this engineering statement. Impedance measurement data, sample system verification measurement data, model derived operating parameters, and reference point field strength measurement data for the KGNW daytime and nighttime directional patterns are tabulated in the figures attached to this engineering statement. 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 KGNW antenna array consists of three, equal height, triangular, uniform cross-section, base insulated, guyed towers. The face width of each tower is 18 inches. The sampling system employs identical toroidal current transformers located at the output of the series pass/reject diplex filter network at the base of each tower. A detailed description of the impedance and sample system measurements and the computer models employed is contained below.

2.1 INDIVIDUAL TOWER IMPEDANCE MEASUREMENTS

Impedance measurements were performed at the base of each tower, by the undersigned, at the output J-Plug immediately adjacent to the sample system toroidal current transformer. The J-Plug and sample current transformer are located at the output of the series pass/reject diplex filter network at the base of each tower. The impedance measurements were performed using a Hewlett-Packard Model 4396A network analyzer; an ENI Model 240L power amplifier; and a Tunwall Radio directional coupler. The base impedance of each tower was measured with the other two towers open-circuited at the corresponding J-Plug location. The measured impedances are tabulated in Figure 2.

A set of parallel capacitors are installed in series with the tower base between the measurement location and the tower base, so that the reactance of these capacitors is included in the impedance measurement for each tower. The capacitive reactance of the parallel capacitor set at the base of each tower was measured separately so that the reactance could be taken into account in the tower and circuit models. The equivalent measured series capacitance for each tower is included in Figure 2.

2.2 INDIVIDUAL TOWER COMPUTER MODELS

A Method of Moments (“MoM”) computer model was developed to model each element in the antenna array using Expert MiniNEC Broadcast Professional (Version 23.0). A wire model was developed for each tower that is comprised of 36 segments.

To replicate the individual measured base impedances to within the tolerance specified in the FCC's Rules, each tower's physical height and the tower #1 radius was adjusted in the MiniNEC model and shunt capacitance and the measured series capacitance was 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 shunt capacitance and the measured series capacitance used in the circuit model 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 actual physical tower heights and radii are all within the tolerances set forth in the FCC's Rules. Further, the magnitude of the lumped shunt capacitances 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.

2.3 DAYTIME AND NIGHTTIME DIRECTIONAL ANTENNA COMPUTER MODELS AND ANTENNA MONITOR PARAMETERS

The KGNW daytime and nighttime directional antenna theoretical 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 daytime and nighttime directional field parameters.

The new daytime and nighttime operating parameters were determined from the modeled base currents and are tabulated in Figure 3. The text files containing all pertinent input and output data associated with the KGNW daytime and nighttime directional antenna computer models are contained in Appendices B and C, respectively.

2.4 SAMPLE SYSTEM DESCRIPTION AND VERIFICATION MEASURMENTS

The KGNW antenna sampling system is comprised of: 1) Delta Electronics, Model TCT-1HV toroidal current transformers mounted in an identical manner at the output of the series pass 820 kHz/reject 950 kHz filter network at the base of each tower; 2) approximate equal lengths of Cablewave Systems, Type FCC 38-50J, 3/8-inch, foam dielectric, coaxial cable between the antenna monitor and the KGNW ATU

buildings and equal lengths (approximate 50 feet) of Andrew, Type LDF2-50A, 3/8-inch, foam dielectric, coaxial extension cables between the end of the Type FCC 38-50 J cable and the toroidal current transformers mounted within the filter enclosures; and 3) a Potomac Instruments model 1901-3 antenna monitor. Each sample line between the filter enclosure where the sample toroidal current transformer is located and the transmitter building, including excess lengths, is buried; therefore, each sample line is subjected to the same environmental conditions.

The electrical lengths of the sample system coaxial cables were verified to be equal in length by measuring the open-circuit series resonant frequency closest to the carrier frequency. The characteristic impedances of the sample coaxial cables were verified by measuring the impedance at frequencies corresponding to odd multiples of 1/8 wavelength (45 degrees) 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 using 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 ENI Model 240L power amplifier; and a Tunwall Radio directional coupler. As demonstrated by the measured values in Figure 4, the sample line lengths are well within 1 electrical degree with respect to each other and the measured characteristic impedances are well within 2 Ohms with respect to 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 toroidal current transformer connected. The measurement was performed at the KGNW operating frequency of 820 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 Delta Electronics Model TCT-1HV toroidal current transformers was verified by driving a common reference current through all three transformers and comparing the outputs as observed on the Hewlett-Packard Model 4396A network analyzer. Based on the test results, the performance of the three current transformers is well within the manufacturer's stated accuracy. A tabulation of the toroidal current transformer measurement data along with the serial number of each current transformer is contained in Figure 5.

The KGNW antenna monitor is a Potomac Instruments Model 1901-3, Serial Number 443. The performance of the antenna monitor was verified, by the undersigned, to be within the manufacture's stated accuracy. The verification was performed by comparison of the measured relative daytime directional operating parameters, as observed on the antenna monitor, with those measured using the network analyzer when the daytime phasing and coupling system common point was driven with the network analyzer swept source through a power amplifier.

3.0 DAYTIME AND NIGHTTIME COMMON POINT IMPEDANCE AND CURRENT

The networks associated with the daytime and nighttime directional antenna systems were adjusted for proper impedance transformation and the daytime and nighttime common point impedance matching networks were set for Z = 50 + j0.0 Ohms. The transmitter output power level was adjusted for a daytime common point current of 32.45 amperes and a nighttime common point current of 10.4 amperes to achieve a daytime input power of approximately 52,650 Watts and a nighttime input power of approximately 5,400 Watts.

4.0 REFERENCE FIELD STRENGTH MEASUREMENTS

Reference field strength measurements were performed on five radials for both the KGNW daytime directional pattern and the KGNW nighttime directional pattern. For the KGNW daytime directional pattern, measurements were performed on the 8º and 252º radial bearings, corresponding to the daytime pattern main radiation lobes; and on

the 82º, 178º, and 310º radial bearings, corresponding to the daytime directional pattern minima. For the KGNW nighttime directional pattern, measurements were performed on the 21º and 239º radial bearings, corresponding to the nighttime pattern main radiation lobes; and on the 113º, 147º, and 310º radial bearings, corresponding to the nighttime directional pattern minima. Three reference field strength measurements were performed on each of the selected daytime and nighttime radial bearings.

The field strength measurements were performed by Mr. Monte Passmore, a contract engineer working for the Carl T. Jones Corporation. Mr. Passmore is experienced in performing field strength measurements on AM directional patterns. Two field intensity meters were used to perform the measurements: Potomac Instruments, Model PI-4100, Serial Number 0352, last calibrated by the manufacturer in July, 2020; and Potomac Instruments, Model FIM-41, Serial Number 2185, last calibrated by the manufacturer in January, 2021.

The measured field strength value for each established reference point location is tabulated in Figure 6, Sheets 1 through 5. The tabulations contained in Figure 6 also include for each reference location: GPS coordinates (NAD83), distance from the KGNW antenna array center, and a description of the measurement location.

5.0 ANTENNAS MOUNTED ON TOWERS AND ISOLATION CIRCUITS

An STL parabolic dish antenna is side mounted near the top of Tower #2 (Center Tower). A parallel resonant isolation circuit is used to allow the STL antenna

transmission line to cross the base insulator without impacting the AM station operation. Austin ring type transformers are used at the base of each tower to allow AC cables to cross the base insulator to power the tower lights.

6.0 SUMMARY

It is submitted that the KGNW daytime and nighttime directional pattern performance has been verified using computer modeling and sample system verification procedures in accordance with Section 47 CFR 73.151(c) of the FCC's Rules and Regulations. It is believed that the 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 IMI reflecting the new model derived directional operating parameters as contained herein and on the attached 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 the information contained therein is believed to be true and correct.

Dated: March 15, 2021

Figure 1

TOWER MODEL HEIGHT AND RADIUS

STATION KGNW - BURIEN - SEATTLE, WASHINGTON
820 kHz - 50 kW DAY, 5 kW NIGHT, U, DA-2
MARCH, 2021

Tower	Physical Height (degrees)	Modeled Height (degrees)	Percent of Physical Height	Tower Face Width (inches)	Equivalent Radius (meters)	Modeled Radius (meters)	Percent of Equivalent Radius
1	87.4	90.55	103.6	18.000	0.2183	0.3056	140.0
2	87.4	93.08	106.5	18.000	0.2183	0.2183	100.0
3	87.4	92.64	106.0	18.000	0.2183	0.2183	100.0

Figure 2

MEASURED AND MODELED IMPEDANCES

STATION KGNW - BURIEN - SEATTLE, WASHINGTON
820 kHz - 50 kW Day, 5 kW NIGHT, U, DA-2
MARCH, 2021

Tower	Measured Tower Base Impedance[1]	Modeled Tower Base Impedance	Shunt Capacitance (pF)	Modeled plus Shunt Reactance	Measured Series Capacitance (pF)	Lumped Series Inductance (uH)	Total Adjusted Tower Base Impedance
1	44.6 +j 6.7	42.7 +j 26.0	160.0	44.5 +j 25.0	10891.8	0.0	44.5 +j 7.2
2	46.4 +j 3.3	46.2 +j 42.9	15.0	46.5 +j 42.8	4898.8	0.0	46.5 +j 3.2
3	45.6 +j 15.7	45.5 +j 38.4	15.0	45.7 +j 38.3	8915.5	0.0	45.7 +j 16.6

[1] Measured at output of the series diplex filter (pass 820 kHz/reject 950 kHz) with other towers open-circuited

Figure 3

ANTENNA MONITOR PARAMETERS
AND COMMON POINT DATA

STATION KGNW - BURIEN-SEATTLE, WASHINGTON
820 kHz - 50 kW DAY, 5.0 kW NIGHT, U, DA-2
MARCH, 2021

DAYTIME		
Tower	**Ratio**	**Phase (deg)**
1	0.517	-80.0
2	1.000	0.0
3	0.527	53.2
Common Point Impedance = 50 +j0.0 Ohms Common Point Current = 32.45 Amperes Antenna Input Power = 52,650 Watts		

NIGHTTIME		
Tower	**Ratio**	**Phase (deg)**
1	0.547	-44.4
2	1.000	0.0
3	0.516	37.1
Common Point Impedance = 50 +j0.0 Ohms Common Point Current = 10.39 Amperes Antenna Input Power = 5,400 Watts		

SAMPLE LINE VERIFICATION MEASUREMENTS

STATION KGNW - BURIEN-SEATTLE, WASHINGTON
820 kHz - 50 kW DAY, 5 kW NIGHT, U, DA-2
MARCH, 2021

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 Toroid Connected[2] (Ohms)
1	1064.2	208.04	886.83	5.09 -j 48.03	1241.57	7.59 +j 48.83	48.85	49.5 +j 0.3
2	1062.5	208.38	885.42	5.17 -j 48.31	1239.58	7.52 +j 48.53	48.85	49.4 +j 0.7
3	1063.1	208.26	885.90	5.11 -j 48.23	1240.26	5.14 +j 48.16	48.47	49.6 +j 0.7

[1] At this frequency, the sample line electrical length is equal to 270°.
[2] At carrier frequency (820 kHz)

Figure 4

Figure 5

SAMPLE DEVICE VERIFICATION MEASUREMENTS

STATION KGNW - BURIEN-SEATTLE, WASHINGTON
820 kHz - 50 kW DAY, 5.0 kW NIGHT, U, DA-2
MARCH, 2021

Reference Sample Toroid Number	Measured Sample Toroid Number	Measured	
		Field Ratio	Phase (degrees)
2	1	0.998	0.10
2	3	0.999	0.02

Sample Toroid Number	Type	Serial Number
1	Delta Electronics, TCT-1HV	731
2	Delta Electronics, TCT-1HV	730
3	Delta Electronics, TCT-1HV	818

REFERENCE FIELD STRENGTH MEASUREMENTS

STATION KGNW - BURIEN-SEATTLE, WASHINGTON
820 kHz - 50 kW-D, 5 kW-N, U, DA-2
MARCH, 2021

8 Degree Radial

Point Number	Distance (km)	Daytime Field (mV/m)	Nighttime Field (mV/m)	Geographic Coordinates (NAD83)		Description
				Latitude	Longitude	
1	1.63	1020	- - -	47° 26' 50.0"	122° 27' 59.2"	Location is at corner of Banks Road and 103rd Avenue SW on north side of Banks Road across from pole #317910.
2	2.45	978	- - -	47° 27' 16.2"	122° 27' 44.1"	Location is at black mailbox to 10021 SW Cove Road 500 feet west of Vashon Highway.
3	4.73	373	- - -	47° 28' 29.4"	122° 27' 36.0"	Location is on northeast corner of intersection of Vashon Highway and SW 145th Place at mailbox cluster.

21 Degree Radial

Point Number	Distance (km)	Daytime Field (mV/m)	Nighttime Field (mV/m)	Geographic Coordinates (NAD83)		Description
				Latitude	Longitude	
1	1.74	- - -	423	47° 26' 51.2"	122° 27' 37.5"	Location is at northwest corner of Vashon Highway and Bank Road next to black postal box.
2	2.32	- - -	403	47° 27' 07.0"	122° 27' 26.6"	Location is at west end of sewage plant fence on south side of SW 171st Street 300 feet before road bend
3	4.33	- - -	136	47° 28' 08.9"	122° 26' 50.2"	Location is at the double green mailboxes at 8908 SW Van Olinda Road on the north side of road.

REFERENCE FIELD STRENGTH MEASUREMENTS

STATION KGNW - BURIEN-SEATTLE, WASHINGTON
820 kHz - 50 kW-D, 5 kW-N, U, DA-2
MARCH, 2021

82 Degree Radial

Point Number	Distance (km)	Daytime Field (mV/m)	Nighttime Field (mV/m)	Geographic Coordinates (NAD83)		Description
				Latitude	Longitude	
1	0.72	894	- - -	47° 26' 01.2"	122° 27' 37.0"	Location is at adress marker for 19021 Vashon Highway on west side of road, 500 feet north of Arco Road.
2	1.45	194	- - -	47° 26' 04.5"	122° 26' 59.2"	Location is at mailbox to 19009 Beall Road SW on east side of road.
3	1.73	168	- - -	47° 26' 07.4"	122° 26' 44.9"	Location is on the west side of Ridge Road 30 ft north of drive to #18911 Ridge Road across from telephone pole.

113 Degree Radial

Point Number	Distance (km)	Daytime Field (mV/m)	Nighttime Field (mV/m)	Geographic Coordinates (NAD83)		Description
				Latitude	Longitude	
1	1.13	- - -	11.1	47° 25' 44.9"	122° 27' 11.1"	Location is at red fire hydrant 100 feet east of entrance to McMurrey School on south side of Cemetary Road.
2	1.96	- - -	3.55	47° 25' 35.4"	122° 26' 40.5"	Location is at mailbox to 19903 87th Avenue SW across street from pole # 057152.
3	2.87	- - -	2.9	47° 25' 23.6"	122° 26' 44.9"	Location is at the northeast corner of 78th Place SW and SW 202nd Place, 10 ft south of street sign.

REFERENCE FIELD STRENGTH MEASUREMENTS

STATION KGNW - BURIEN-SEATTLE, WASHINGTON
820 kHz - 50 kW-D, 5 kW-N, U, DA-2
MARCH, 2021

147 Degree Radial

Point Number	Distance (km)	Daytime Field (mV/m)	Nighttime Field (mV/m)	Geographic Coordinates (NAD83)		Description
				Latitude	Longitude	
1	1.87	- - -	21.5	47° 25' 07.9"	122° 27' 16.5"	Location is at the address sign to 20582 94th Place SW at the end of the road.
2	4.31	- - -	6.75	47° 24' 00.7"	122° 26' 14.6"	Location is at the street sign at the intersection of SW 228th Street and Kingsbury Road across street from pole # 3L5022.
3	5.68	- - -	9.5	47° 23' 25.9"	122° 25' 38.2"	Location is on the east side of Dockton Road opposite drive to #23829 Dockton Road.

178 Degree Radial

Point Number	Distance (km)	Daytime Field (mV/m)	Nighttime Field (mV/m)	Geographic Coordinates (NAD83)		Description
				Latitude	Longitude	
1	0.97	296	- - -	47° 25' 01.9"	122° 28' 05.0"	Location is at pole #244061 on north side of SW 200th Street, 75 feet east of intersection with 105th Avenue.
2	2.41	58.7	- - -	47° 24' 01.4"	122° 28' 00.0"	Location is at mailbox to 22902 SW 228th Street at northwest corner of intersection with 104th Avenue SW.
3	4.67	44.1	- - -	47° 23' 21.3"	122° 28' 00.4"	Location is at 10320 Burton Drive at the southeast corner of the Fire Station #2 Building.

REFERENCE FIELD STRENGTH MEASUREMENTS

STATION KGNW - BURIEN-SEATTLE, WASHINGTON
820 kHz - 50 kW-D, 5 kW-N, U, DA-2
MARCH, 2021

239 Degree Radial

Point Number	Distance (km)	Daytime Field (mV/m)	Nighttime Field (mV/m)	Geographic Coordinates (NAD83)		Description
				Latitude	Longitude	
1	0.90	- - -	414	47° 25' 45.2"	122° 28' 43.8"	Location is at pole # 061710 on north side of SW Cemetary Road, 50 feet west of SW Singer Road.
2	2.99	- - -	175	47° 25' 09.3"	122° 30' 11.9"	Location is at address sign for 20708 Westside Highway, 90 feet south of SW 207th Lane.
3	3.75	- - -	72.4	47° 24' 56.5"	122° 30' 41.1"	Location is at pole # 116710 on SW Madrona Road 0.8 miles west of Westside Highway.

252 Degree Radial

Point Number	Distance (km)	Daytime Field (mV/m)	Nighttime Field (mV/m)	Geographic Coordinates (NAD83)		Description
				Latitude	Longitude	
1	1.05	2390	- - -	47° 25' 50.2"	122° 28' 55.4"	Location is at steel address marker to 19409 115th Avenue SW on west side of road.
2	1.45	934	- - -	47° 25' 45.1"	122° 29' 21.6"	Location is at black mailbox to 12028 Cemetary Road on north side of road.
3	2.67	807	- - -	47° 25' 31.2"	122° 30' 12.2"	At electrical transformer # 315969 at SW corner of intersection of Westside Drive and Levi Langell Road.

REFERENCE FIELD STRENGTH MEASUREMENTS

STATION KGNW - BURIEN-SEATTLE, WASHINGTON
820 kHz - 50 kW-D, 5 kW-N, U, DA-2
MARCH, 2021

310 Degree Radial

Point Number	Distance (km)	Daytime Field (mV/m)	Nighttime Field (mV/m)	Geographic Coordinates (NAD83)		Description
				Latitude	Longitude	
1	2.09	563	127	47° 26' 48.0"	122° 29' 23.0"	Location is in front of address sign for 17630 121st Avenue SW, 500 feet south of SW Bank Road.
2	2.41	360	78.4	47° 26' 49.0"	122° 29' 39.0"	Location is at white mailbox for 17630 SW Bank Road, across road from pole #253010.
3	3.62	187	43.5	47° 27' 13.9"	122° 30' 21.6"	Location is on the east side of Westside Highway opposite telephone pole #317002/158651.

APPENDIX A

Individual Tower Models

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							
.82	42.687	26.041	50.003	31.4	1.7814	-11.027	-.35709

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	.3056	36
		0	0	90.55		
2	none	135.	130.	0	.2183	36
		135.	130.	93.08		
3	none	270.	130.	0	.2183	36
		270.	130.	92.64		

Number of wires = 3
current nodes = 108

Individual wires	minimum wire	minimum value	maximum wire	maximum value
segment length	1	2.51528	2	2.58556
radius	2	.2183	1	.3056

ELECTRICAL DESCRIPTION – TOWER #1
Frequencies (MHz)

no.	frequency lowest	step	no. of steps	segment length (wavelengths) minimum	maximum
1	.82	0	1	6.99E-03	7.18E-03

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	0	0	0	0
2	37	.1	0	0	1.5E-05	0
3	73	.1	0	0	1.5E-05	0

IMPEDANCE – TOWER #2
normalization = 50.

freq (MHz)	resist (ohms)	react (ohms)	imped (ohms)	phase (deg)	VSWR	S11 dB	S12 dB
source = 1; node 37, sector 1							
.82	46.21	42.86	63.027	42.8	2.3813	-7.7758	-.79295

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	.3056	36
		0	0	90.55		
2	none	135.	130.	0	.2183	36
		135.	130.	93.08		
3	none	270.	130.	0	.2183	36
		270.	130.	92.64		

Number of wires = 3
current nodes = 108

Individual wires	minimum wire	minimum value	maximum wire	maximum value
segment length	1	2.51528	2	2.58556
radius	2	.2183	1	.3056

ELECTRICAL DESCRIPTION – TOWER #2
Frequencies (MHz)

no.	frequency lowest	step	no. of steps	segment length (wavelengths) minimum	maximum
1	.82	0	1	6.99E-03	7.18E-03

Sources

source	node	sector	magnitude	phase	type
1	37	1	1.	0	voltage

Lumped loads

load	node	resistance (ohms)	reactance (ohms)	inductance (mH)	capacitance (uF)	passive circuit
1	1	.1	0	0	1.6E-04	0
2	37	.1	0	0	0	0
3	73	.1	0	0	1.5E-05	0

IMPEDANCE – TOWER #3
normalization = 50.

freq (MHz)	resist (ohms)	react (ohms)	imped (ohms)	phase (deg)	VSWR	S11 dB	S12 dB
source = 1; node 73, sector 1							
.82	45.476	38.38	59.507	40.2	2.2029	-8.5064	-.66029

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	.3056	36
		0	0	90.55		
2	none	135.	130.	0	.2183	36
		135.	130.	93.08		
3	none	270.	130.	0	.2183	36
		270.	130.	92.64		

Number of wires = 3
current nodes = 108

Individual wires	minimum wire	minimum value	maximum wire	maximum value
segment length	1	2.51528	2	2.58556
radius	2	.2183	1	.3056

ELECTRICAL DESCRIPTION – TOWER #3
Frequencies (MHz)

no.	frequency lowest	step	no. of steps	segment length (wavelengths) minimum	maximum
1	.82	0	1	6.99E-03	7.18E-03

Sources

source	node	sector	magnitude	phase	type
1	73	1	1.	0	voltage

Lumped loads

load	node	resistance (ohms)	reactance (ohms)	inductance (mH)	capacitance (uF)	passive circuit
1	1	.1	0	0	1.6E-04	0
2	37	.1	0	0	1.5E-05	0
3	73	.1	0	0	0	0

APPENDIX B

Daytime Directional Pattern 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							
.82	94.86	14.784	96.005	8.9	1.9602	-9.779	-.48284
source = 2; node 37, sector 1							
.82	45.951	32.887	56.507	35.6	1.9703	-9.7177	-.49011
source = 3; node 73, sector 1							
.82	26.947	7.1003	27.867	14.8	1.9076	-10.113	-.44524

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	.3056	36
		0	0	90.55		
2	none	135.	130.	0	.2183	36
		135.	130.	93.08		
3	none	270.	130.	0	.2183	36
		270.	130.	92.64		

Number of wires = 3
current nodes = 108

	minimum wire	minimum value	maximum wire	maximum value
Individual wires				
segment length	1	2.51528	2	2.58556
radius	2	.2183	1	.3056

ELECTRICAL DESCRIPTION – DAYTIME OPERATION
Frequencies (MHz)

no.	frequency lowest	step	no. of steps	segment length (wavelengths) minimum	maximum
1	.82	0	1	6.99E-03	7.18E-03

Sources

source	node	sector	magnitude	phase	type
1	1	1	1,776.67	19.1	voltage
2	37	1	2,008.9	130.1	voltage
3	73	1	521.455	162.6	voltage

Lumped loads

load	node	resistance (ohms)	reactance (ohms)	inductance (mH)	capacitance (uF)	passive circuit
1	1	.1	0	0	0	0
2	37	.1	0	0	0	0
3	73	.1	0	0	0	0

RMS CURRENT – DAYTIME OPERATION
Frequency = .82 MHz
Input power = 50,000. watts
Efficiency = 99.8 %
coordinates in degrees

current no.	X	Y	Z	mag (amps)	phase (deg)	real (amps)	imaginary (amps)
GND	0	0	0	13.0857	10.2	12.878	2.3224
2	0	0	2.51528	13.158	8.1	13.0257	1.86105
3	0	0	5.03056	13.1785	7.	13.0815	1.5956

4	0	0	7.54583	13.1721	6.	13.101	1.3665
5	0	0	10.0611	13.1398	5.1	13.0883	1.16141
6	0	0	12.5764	13.0823	4.3	13.046	.973685
7	0	0	15.0917	12.9999	3.5	12.9753	.800069
8	0	0	17.607	12.8929	2.8	12.877	.63872
9	0	0	20.1222	12.7612	2.2	12.7519	.488487
10	0	0	22.6375	12.6053	1.6	12.6005	.348635
11	0	0	25.1528	12.4251	1.	12.4232	.218666
12	0	0	27.6681	12.221	.5	12.2206	.0982404
13	0	0	30.1833	11.993	359.9	11.993	-.0128796
14	0	0	32.6986	11.7416	359.4	11.741	-.114863
15	0	0	35.2139	11.467	359.	11.4652	-.207832
16	0	0	37.7292	11.1697	358.5	11.1658	-.291876
17	0	0	40.2445	10.8498	358.1	10.8436	-.367064
18	0	0	42.7597	10.508	357.6	10.499	-.433448
19	0	0	45.275	10.1446	357.2	10.1327	-.491075
20	0	0	47.7903	9.76007	356.8	9.74513	-.539983
21	0	0	50.3056	9.35492	356.4	9.33691	-.580208
22	0	0	52.8208	8.9296	356.1	8.90862	-.611783
23	0	0	55.3361	8.48465	355.7	8.46088	-.634744
24	0	0	57.8514	8.02057	355.4	7.99426	-.649123
25	0	0	60.3667	7.53776	355.	7.50926	-.654952
26	0	0	62.882	7.03669	354.7	7.00639	-.652258
27	0	0	65.3972	6.51775	354.4	6.48614	-.641063
28	0	0	67.9125	5.98123	354.	5.94886	-.621378
29	0	0	70.4278	5.42728	353.7	5.39477	-.593194
30	0	0	72.9431	4.85586	353.4	4.82387	-.556471
31	0	0	75.4583	4.26657	353.1	4.23585	-.511119
32	0	0	77.9736	3.65851	352.8	3.62986	-.456961
33	0	0	80.4889	3.0298	352.5	3.00411	-.39367
34	0	0	83.0042	2.37678	352.2	2.35505	-.320629
35	0	0	85.5195	1.69159	352.	1.67497	-.23654
36	0	0	88.0347	.958938	351.7	.948823	-.138909
END	0	0	90.55	0	0	0	0
GND	-86.7763	-103.416	0	25.1386	94.5	-1.98534	25.0601
38	-86.7763	-103.416	2.58556	25.3937	93.7	-1.62357	25.3418
39	-86.7763	-103.416	5.17111	25.5002	93.1	-1.39687	25.4619
40	-86.7763	-103.416	7.75667	25.5374	92.7	-1.20038	25.5092
41	-86.7763	-103.416	10.3422	25.5136	92.3	-1.02314	25.4931
42	-86.7763	-103.416	12.9278	25.4327	91.9	-.860067	25.4181
43	-86.7763	-103.416	15.5133	25.2967	91.6	-.708648	25.2868
44	-86.7763	-103.416	18.0989	25.1071	91.3	-.567466	25.1007
45	-86.7763	-103.416	20.6844	24.865	91.	-.435645	24.8612
46	-86.7763	-103.416	23.27	24.5712	90.7	-.312631	24.5693
47	-86.7763	-103.416	25.8556	24.2267	90.5	-.198065	24.2259
48	-86.7763	-103.416	28.4411	23.8323	90.2	-.0917032	23.8321
49	-86.7763	-103.416	31.0267	23.3887	90.	6.61E-03	23.3887
50	-86.7763	-103.416	33.6122	22.8969	89.8	.0969952	22.8967
51	-86.7763	-103.416	36.1978	22.3579	89.5	.179512	22.3572
52	-86.7763	-103.416	38.7833	21.7727	89.3	.254211	21.7712
53	-86.7763	-103.416	41.3689	21.1421	89.1	.321127	21.1397
54	-86.7763	-103.416	43.9544	20.4673	88.9	.38028	20.4638
55	-86.7763	-103.416	46.54	19.7494	88.7	.431689	19.7447
56	-86.7763	-103.416	49.1256	18.9896	88.6	.475367	18.9836
57	-86.7763	-103.416	51.7111	18.1889	88.4	.511329	18.1817
58	-86.7763	-103.416	54.2967	17.3486	88.2	.53959	17.3402
59	-86.7763	-103.416	56.8822	16.4698	88.1	.560165	16.4603
60	-86.7763	-103.416	59.4678	15.5539	87.9	.573073	15.5433
61	-86.7763	-103.416	62.0533	14.6018	87.7	.578332	14.5904
62	-86.7763	-103.416	64.6389	13.6148	87.6	.575961	13.6026
63	-86.7763	-103.416	67.2245	12.5937	87.4	.565974	12.581
64	-86.7763	-103.416	69.81	11.5394	87.3	.548379	11.5264
65	-86.7763	-103.416	72.3956	10.4525	87.1	.52317	10.4394

66	-86.7763	-103.416	74.9811	9.33325	87.	.490317	9.32037
67	-86.7763	-103.416	77.5667	8.18115	86.8	.449752	8.16877
68	-86.7763	-103.416	80.1522	6.99496	86.7	.401338	6.98344
69	-86.7763	-103.416	82.7378	5.77162	86.6	.344815	5.76131
70	-86.7763	-103.416	85.3233	4.50495	86.4	.279687	4.49626
71	-86.7763	-103.416	87.9089	3.18146	86.3	.204919	3.17485
72	-86.7763	-103.416	90.4945	1.7709	86.2	.118233	1.76695
END	-86.7763	-103.416	93.08	0	0	0	0
GND	-173.553	-206.832	0	13.2316	147.8	-11.1963	7.05104
74	-173.553	-206.832	2.57333	13.2515	147.3	-11.15	7.16101
75	-173.553	-206.832	5.14667	13.2364	147.	-11.0979	7.21376
76	-173.553	-206.832	7.72	13.1951	146.7	-11.0294	7.24324
77	-173.553	-206.832	10.2933	13.1288	146.5	-10.9435	7.253
78	-173.553	-206.832	12.8667	13.038	146.2	-10.8398	7.2448
79	-173.553	-206.832	15.44	12.9229	146.	-10.7182	7.21955
80	-173.553	-206.832	18.0133	12.784	145.8	-10.5787	7.17784
81	-173.553	-206.832	20.5867	12.6215	145.7	-10.4214	7.12014
82	-173.553	-206.832	23.16	12.4358	145.5	-10.2466	7.04665
83	-173.553	-206.832	25.7333	12.2271	145.3	-10.0544	6.95779
84	-173.553	-206.832	28.3067	11.996	145.2	-9.84525	6.8538
85	-173.553	-206.832	30.88	11.7427	145.	-9.61926	6.73497
86	-173.553	-206.832	33.4533	11.4677	144.9	-9.37694	6.60156
87	-173.553	-206.832	36.0267	11.1714	144.7	-9.11849	6.45386
88	-173.553	-206.832	38.6	10.8543	144.6	-8.84448	6.29215
89	-173.553	-206.832	41.1733	10.517	144.4	-8.55528	6.11673
90	-173.553	-206.832	43.7467	10.1599	144.3	-8.25122	5.92792
91	-173.553	-206.832	46.32	9.78355	144.2	-7.93288	5.72602
92	-173.553	-206.832	48.8933	9.38865	144.1	-7.60076	5.51137
93	-173.553	-206.832	51.4667	8.97567	143.9	-7.25526	5.2843
94	-173.553	-206.832	54.04	8.54518	143.8	-6.89685	5.04515
95	-173.553	-206.832	56.6133	8.09781	143.7	-6.52609	4.79424
96	-173.553	-206.832	59.1867	7.63414	143.6	-6.14343	4.53192
97	-173.553	-206.832	61.76	7.15472	143.5	-5.74935	4.25851
98	-173.553	-206.832	64.3333	6.66008	143.4	-5.34429	3.97433
99	-173.553	-206.832	66.9067	6.1507	143.3	-4.92864	3.67963
100	-173.553	-206.832	69.48	5.62699	143.1	-4.50274	3.37466
101	-173.553	-206.832	72.0533	5.08921	143.	-4.06684	3.05956
102	-173.553	-206.832	74.6267	4.53747	142.9	-3.62103	2.73438
103	-173.553	-206.832	77.2	3.9716	142.8	-3.16518	2.399
104	-173.553	-206.832	79.7733	3.39094	142.7	-2.69882	2.05301
105	-173.553	-206.832	82.3467	2.79403	142.6	-2.22079	1.69549
106	-173.553	-206.832	84.92	2.1779	142.5	-1.72879	1.32459
107	-173.553	-206.832	87.4933	1.53607	142.4	-1.21769	.936343
108	-173.553	-206.832	90.0667	.854008	142.3	-.676086	.521763
END	-173.553	-206.832	92.64	0	0	0	0

APPENDIX C

Nighttime Directional Pattern Model

Consulting Engineers
CTJC
CARL T. JONES CORPORATION

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							
.82	72.931	-10.674	73.708	351.7	1.5157	-13.766	-.18642
source = 2; node 37, sector 1							
.82	47.778	22.921	52.992	25.6	1.595	-12.792	-.23456
source = 3; node 73, sector 1							
.82	29.145	9.3174	30.598	17.7	1.8036	-10.854	-.37229

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	.3056	36
		0	0	90.55		
2	none	135.	130.	0	.2183	36
		135.	130.	93.08		
3	none	270.	130.	0	.2183	36
		270.	130.	92.64		

Number of wires = 3
current nodes = 108

	minimum wire	minimum value	maximum wire	maximum value
Individual wires				
segment length	1	2.51528	2	2.58556
radius	2	.2183	1	.3056

ELECTRICAL DESCRIPTION – NIGHTTIME OPERATION
Frequencies (MHz)

no.	frequency lowest	step	no. of steps	segment length (wavelengths) minimum	maximum
1	.82	0	1	6.99E-03	7.18E-03

Sources

source	node	sector	magnitude	phase	type
1	1	1	454.564	359.9	voltage
2	37	1	604.593	81.4	voltage
3	73	1	179.851	110.7	voltage

Lumped loads

load	node	resistance (ohms)	reactance (ohms)	inductance (mH)	capacitance (uF)	passive circuit
1	1	.1	0	0	0	0
2	37	.1	0	0	0	0
3	73	.1	0	0	0	0

RMS CURRENT – NIGHTTIME OPERATION
Frequency = .82 MHz
Input power = 5,000. watts
Efficiency = 99.8 %
coordinates in degrees

current no.	X	Y	Z	mag (amps)	phase (deg)	real (amps)	imaginary (amps)
GND	0	0	0	4.36081	8.2	4.31568	.625721
2	0	0	2.51528	4.34071	6.6	4.31171	.500869
3	0	0	5.03056	4.32165	5.7	4.3003	.429061

4	0	0	7.54583	4.29709	4.9	4.28138	.367119
5	0	0	10.0611	4.26638	4.2	4.25498	.3117
6	0	0	12.5764	4.22921	3.5	4.22115	.261004
7	0	0	15.0917	4.18542	2.9	4.17994	.214154
8	0	0	17.607	4.13492	2.4	4.1314	.170643
9	0	0	20.1222	4.0777	1.8	4.07562	.130163
10	0	0	22.6375	4.01376	1.3	4.01269	.0925114
11	0	0	25.1528	3.94312	.8	3.9427	.0575531
12	0	0	27.6681	3.86586	.4	3.86578	.0251934
13	0	0	30.1833	3.78203	359.9	3.78203	-4.63E-03
14	0	0	32.6986	3.69172	359.5	3.69158	-.0319773
15	0	0	35.2139	3.59503	359.1	3.59458	-.0568718
16	0	0	37.7292	3.49208	358.7	3.49118	-.0793444
17	0	0	40.2445	3.38298	358.3	3.38152	-.099417
18	0	0	42.7597	3.26788	357.9	3.26578	-.117107
19	0	0	45.275	3.1469	357.6	3.14411	-.132428
20	0	0	47.7903	3.02019	357.2	3.01669	-.145396
21	0	0	50.3056	2.88792	356.9	2.88371	-.156023
22	0	0	52.8208	2.75023	356.6	2.74532	-.164323
23	0	0	55.3361	2.60729	356.3	2.60172	-.170308
24	0	0	57.8514	2.45924	355.9	2.45308	-.173991
25	0	0	60.3667	2.30623	355.6	2.29955	-.175384
26	0	0	62.882	2.14841	355.3	2.14131	-.1745
27	0	0	65.3972	1.98588	355.1	1.97847	-.17135
28	0	0	67.9125	1.81874	354.8	1.81115	-.165939
29	0	0	70.4278	1.64705	354.5	1.63943	-.158271
30	0	0	72.9431	1.47078	354.2	1.46328	-.148341
31	0	0	75.4583	1.28984	353.9	1.28263	-.13613
32	0	0	77.9736	1.10394	353.7	1.09722	-.121596
33	0	0	80.4889	.912539	353.4	.906517	-.10466
34	0	0	83.0042	.714554	353.2	.709461	-.0851632
35	0	0	85.5195	.507632	352.9	.503737	-.0627689
36	0	0	88.0347	.287237	352.6	.284866	-.0368248
END	0	0	90.55	0	0	0	0
GND	-86.7763	-103.416	0	8.06751	55.8	4.53664	6.6711
38	-86.7763	-103.416	2.58556	8.12277	54.9	4.67281	6.64412
39	-86.7763	-103.416	5.17111	8.14068	54.3	4.74694	6.61341
40	-86.7763	-103.416	7.75667	8.13889	53.9	4.79989	6.57286
41	-86.7763	-103.416	10.3422	8.11923	53.4	4.83598	6.52189
42	-86.7763	-103.416	12.9278	8.08257	53.1	4.85725	6.46027
43	-86.7763	-103.416	15.5133	8.0294	52.7	4.86473	6.38793
44	-86.7763	-103.416	18.0989	7.96006	52.4	4.85907	6.30491
45	-86.7763	-103.416	20.6844	7.87481	52.1	4.84072	6.21128
46	-86.7763	-103.416	23.27	7.7739	51.8	4.81001	6.10716
47	-86.7763	-103.416	25.8556	7.65756	51.5	4.76721	5.99266
48	-86.7763	-103.416	28.4411	7.52605	51.2	4.71257	5.86798
49	-86.7763	-103.416	31.0267	7.37962	51.	4.6463	5.7333
50	-86.7763	-103.416	33.6122	7.21853	50.7	4.56862	5.58882
51	-86.7763	-103.416	36.1978	7.04307	50.5	4.47975	5.43476
52	-86.7763	-103.416	38.7833	6.85353	50.3	4.3799	5.27137
53	-86.7763	-103.416	41.3689	6.65024	50.1	4.2693	5.0989
54	-86.7763	-103.416	43.9544	6.43352	49.9	4.14817	4.91761
55	-86.7763	-103.416	46.54	6.20372	49.6	4.01674	4.72778
56	-86.7763	-103.416	49.1256	5.96118	49.5	3.87525	4.52969
57	-86.7763	-103.416	51.7111	5.70628	49.3	3.72395	4.32364
58	-86.7763	-103.416	54.2967	5.43938	49.1	3.56307	4.10991
59	-86.7763	-103.416	56.8822	5.16086	48.9	3.39288	3.88881
60	-86.7763	-103.416	59.4678	4.87109	48.7	3.21361	3.66063
61	-86.7763	-103.416	62.0533	4.57041	48.5	3.02551	3.42563
62	-86.7763	-103.416	64.6389	4.25918	48.4	2.8288	3.1841
63	-86.7763	-103.416	67.2245	3.9377	48.2	2.62369	2.93628
64	-86.7763	-103.416	69.81	3.60622	48.1	2.41034	2.68237
65	-86.7763	-103.416	72.3956	3.26493	47.9	2.18889	2.42251

66	-86.7763	-103.416	74.9811	2.9139	47.7	1.95936	2.15678
67	-86.7763	-103.416	77.5667	2.55299	47.6	1.72168	1.8851
68	-86.7763	-103.416	80.1522	2.18181	47.4	1.47556	1.60718
69	-86.7763	-103.416	82.7378	1.79941	47.3	1.22035	1.32236
70	-86.7763	-103.416	85.3233	1.40386	47.2	.954706	1.02925
71	-86.7763	-103.416	87.9089	.990982	47.	.67576	.72484
72	-86.7763	-103.416	90.4945	.551363	46.9	.377009	.402325
END	-86.7763	-103.416	93.08	0	0	0	0
GND	-173.553	-206.832	0	4.15621	93.	-.217888	4.15049
74	-173.553	-206.832	2.57333	4.16556	92.5	-.178418	4.16174
75	-173.553	-206.832	5.14667	4.16274	92.1	-.153692	4.15991
76	-173.553	-206.832	7.72	4.15147	91.8	-.132246	4.14936
77	-173.553	-206.832	10.2933	4.13214	91.6	-.112884	4.1306
78	-173.553	-206.832	12.8667	4.10497	91.3	-.0950542	4.10387
79	-173.553	-206.832	15.44	4.07008	91.1	-.078481	4.06933
80	-173.553	-206.832	18.0133	4.0276	90.9	-.0630107	4.0271
81	-173.553	-206.832	20.5867	3.97762	90.7	-.0485489	3.97732
82	-173.553	-206.832	23.16	3.92025	90.5	-.0350359	3.92009
83	-173.553	-206.832	25.7333	3.85558	90.3	-.0224333	3.85552
84	-173.553	-206.832	28.3067	3.78375	90.2	-.010716	3.78373
85	-173.553	-206.832	30.88	3.70487	90.	1.32E-04	3.70487
86	-173.553	-206.832	33.4533	3.61908	89.8	.0101222	3.61906
87	-173.553	-206.832	36.0267	3.5265	89.7	.0192595	3.52645
88	-173.553	-206.832	38.6	3.42731	89.5	.0275481	3.4272
89	-173.553	-206.832	41.1733	3.32165	89.4	.0349897	3.32147
90	-173.553	-206.832	43.7467	3.20969	89.3	.041585	3.20942
91	-173.553	-206.832	46.32	3.0916	89.1	.0473338	3.09123
92	-173.553	-206.832	48.8933	2.96754	89.	.0522358	2.96708
93	-173.553	-206.832	51.4667	2.83772	88.9	.0562905	2.83716
94	-173.553	-206.832	54.04	2.7023	88.7	.0594973	2.70164
95	-173.553	-206.832	56.6133	2.56146	88.6	.0618562	2.56071
96	-173.553	-206.832	59.1867	2.41539	88.5	.0633667	2.41456
97	-173.553	-206.832	61.76	2.26427	88.4	.0640288	2.26336
98	-173.553	-206.832	64.3333	2.10825	88.3	.0638425	2.10728
99	-173.553	-206.832	66.9067	1.94749	88.2	.0628071	1.94648
100	-173.553	-206.832	69.48	1.78212	88.	.0609214	1.78107
101	-173.553	-206.832	72.0533	1.6122	87.9	.0581826	1.61115
102	-173.553	-206.832	74.6267	1.43778	87.8	.0545853	1.43674
103	-173.553	-206.832	77.2	1.25879	87.7	.0501198	1.25779
104	-173.553	-206.832	79.7733	1.07503	87.6	.0447687	1.07409
105	-173.553	-206.832	82.3467	.886014	87.5	.0385009	.885177
106	-173.553	-206.832	84.92	.690816	87.4	.031259	.690108
107	-173.553	-206.832	87.4933	.487361	87.3	.0229251	.486821
108	-173.553	-206.832	90.0667	.271031	87.2	.0132417	.270708
END	-173.553	-206.832	92.64	0	0	0	0