7136 S Yale Ave
Suite 501
Tulsa, OK 74133

o 918.664.4581
f 918.664.3066

www.iHeartMedia.com
www.iHeartRadio.com
#iheartradio

February 17, 2023

VIA EMAIL

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

RE: IHM LICENSES, LLC (FRN No. 0014042816)
FCC Form 302-AM
KXYZ (AM), 1320 kHz, Houston, TX; Facility ID No. 95

Dear Ms. Dortch:

On behalf of IHM LICENSES, LLC, the licensee of the above-referenced station, enclosed is a copy of FCC Form 302-AM.

Please contact the undersigned with any communications concerning this application.

Respectfully submitted,
IHM LICENSES, LLC

By: Troy Langham
VP, Technical Regulatory Affairs

cc: Public Inspection File

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)

IHM LICENSES, LLC

MAILING ADDRESS (Line 1) (Maximum 35 characters)
7136 S YALE AVE

MAILING ADDRESS (Line 2) (Maximum 35 characters)
SUITE 501

CITY	STATE OR COUNTRY (if foreign address)	ZIP CODE
TULSA	OK	74136

TELEPHONE NUMBER (include area code)	CALL LETTERS	OTHER FCC IDENTIFIER (If applicable)
918-664-4581	KXYZ	95

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	$ 645.00	

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	$ 1260.00	

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
$ 1905.00	

SECTION II - APPLICANT INFORMATION		
1. NAME OF APPLICANT IHM LICENSES, LLC		
MAILING ADDRESS 7136 S YALE AVE, SUITE 501		
CITY TULSA	STATE OK	ZIP CODE 74136

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
KXYZ	HOUSTON, TX	BP-20210125AAC		05/04/2024

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

☐ Yes ☑ No

If No, explain in an Exhibit.

Exhibit No.

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

☑ Yes ☐ No

If No, state exceptions in an Exhibit.

Exhibit No.

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

☐ Yes ☑ No

If Yes, explain in an Exhibit.

Exhibit No.

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

☑ Yes ☐ No

☐ Does not apply

If No, explain in an Exhibit.

Exhibit No.

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

☐ Yes ☑ No

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

Exhibit No.

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

☐ Yes ☑ No

If Yes, provide particulars as an Exhibit.

Exhibit No.

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

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

CERTIFICATION

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

☑ Yes ☐ No

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

Name	Signature	
Troy Langham	Troy Langham Digitally signed by Troy Langham DN: cn=Troy Langham, o, ou, email=Troylangham@iheartmedia.com, c=US Date: 2023.02.17 07:21:28 -06'00'	
Title	Date	Telephone Number
VP, Technical Regulatory Affairs	2/14/2023	918-664-4581

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
IHM Licensees, LLC

PURPOSE OF AUTHORIZATION APPLIED FOR: (check one)

☑ Station License BMML- ☐ 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
KXYZ	BP-20210125AAC	1320	Unlimited	2.8	8.4

2. Station location

State	City or Town
Texas	Houston

3. Transmitter location

State	County	City or Town	Street address (or other identification)
TX	Harris	Houston	3000 Hansom Rd

4. Main studio location

State	County	City or Town	Street address (or other identification)
TX	Harris	Houston	1233 West Loop South

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

State	County	City or Town	Street address (or other identification)
TX	Harris	Houston	1233 West Loop South

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

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

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

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
7.78	13.30

Measured antenna or common point resistance (in ohms) at operating frequency		Measured antenna or common point reactance (in ohms) at operating frequency	
Night	Day	Night	Day
50	50	-j 12.6	-j 12.6

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(NEC) - ASR#1058675	84.2	84.2	0.888	0.888	---	---
2(SEC) - ASR#1058676	0.0	0.0	1.000	1.000	---	---
3(SE) - ASR#1058677	165.5	165.5	0.603	0.603	---	---

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

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, tower	103.5	104.9	106.2	Exhibit No. N/A

Excitation ☑ Series ☐ Shunt

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

North Latitude	West Longitude
29 ° 54 ' 56 "	95 ° 27 ' 42 "

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?

None

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 (check appropriate box below)
James D. Sadler	
Address (include ZIP Code)	Date
Carl T. Jones Corporation 7901 Yarnwood Ct Springfield, VA 22153	February 6, 2023
	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 EXHIBIT
IN SUPPORT OF AN
APPLICATION FOR STATION LICENSE
STATION KXYZ - HOUSTON, TEXAS
1320 kHz – 8.4 kW-D, 2.8 kW-N, U, DA-2
Facility ID: 95

Applicant: IHM Licensees, LLC

FEBRUARY, 2023

7901 Yarnwood Court
Springfield, VA 22153-2899

tel: (703) 569-7704
fax: (703) 569-6417

email: info@ctjc.com
www.ctjc.com

TABLE OF CONTENTS

SECTION III OF FCC FORM 302-AM

ENGINEERING STATEMENT OF JAMES D. SADLER

FIGURE

Consulting Engineers CTJC CARL T. JONES CORPORATION

Consulting Engineers
CTJC
CARL T. JONES CORPORATION

ENGINEERING STATEMENT OF JAMES D. SADLER
IN SUPPORT OF AN
APPLICATION FOR STATION LICENSE
STATION KXYZ - HOUSTON, TEXAS
1320 kHz – 8.4 kW-D, 2.8 kW-N, U, DA-2
Facility ID: 95

Applicant: IHM Licensees, LLC

I am a Technical Consultant, an employee 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.

1.0 GENERAL

This office has been authorized by IHM Licensees ("IHM"), licensee of AM Radio Station KXYZ, to prepare this engineering statement, FCC Form 302-AM, Section III, and the associated figures and appendices in support of an Application for License. Station KXYZ is licensed for operation on 1320 kilohertz with a daytime power of 10 kilowatts and a nighttime power of 5 kilowatts. The station uses the same directional antenna pattern for its daytime and nighttime operations (DA-2).

IHM was granted a Construction Permit on May 4, 2021, FCC File No. BP-20211012AAC, that authorizes relocation of the KXYZ transmission facilities to the transmitter site of Station KBME. The KXYZ Construction Permit authorizes operation

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

on 1320 kilohertz at a daytime power of 8.4 kilowatts and a nighttime power of 2.8 kilowatts employing the same three-tower directional antenna pattern for its daytime and nighttime operation (DA-2).

Station KBME is licensed for operation on 790 kilohertz at a power of 5 kilowatts during daytime and nighttime hours. The station uses a four tower directional antenna during daytime hours and an eight tower directional antenna during nighttime hours (DA-2). The four daytime towers are shared with the nighttime directional array. AM Station KPRC, licensed to serve Houston, Texas, also holds a construction permit, FCC File No. BP-20200917AAN, to relocate its transmission facilities to the transmitter site of Station KBME. Station KPRC is authorized to operate on 950 kHz at a daytime power of 7 kilowatts and a nighttime power of 4.3 kilowatts employing a single tower for daytime non-directional operation and four towers for nighttime directional operation (DA-N).

After completion of the installation of the new KXYZ and KPRC phasing and coupling systems and all triplexing filters required to minimize interaction between the three collocated stations, the KXYZ directional antenna pattern was verified using computer modeling and sample system verification techniques as described in Section 47 CFR 73.151(c) of the FCC's Rules and Regulations. The specific measurement and modeling techniques used in performing the verification of the KXYZ daytime and nighttime 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 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, C, and D.

2.0 IMPEDANCE MEASUREMENTS, COMPUTER MODELING AND SAMPLE SYSTEM VERIFICATION

The proof of performance contained herein is based on the computer modeling and sample system verification procedures described in Section 47 CFR 73.151(c) of the FCC's Rules and Regulations. The KXYZ daytime and nighttime antenna arrays use three of the eight KBME triangular, uniform cross-section, guyed, series fed towers. The five unused towers are detuned at the KXYZ operating frequency. The height of each tower is 164.1 electrical degrees. The sampling system employs identical Kintronic Labs, Model VSU-INT, voltage sampling devices located on the tower side of the filter circuits and series capacitor at the output to the tower feed line.

2.1 INDIVIDUAL TOWER IMPEDANCE MEASUREMENTS

Tower base impedance measurements were performed at the triplex filter cabinet c output J-Plug located immediately adjacent to the KXYZ voltage sample unit. The triplex filter J-Plugs for KXYZ Towers 1, 2 and 3 are labeled JCOM61, JCOM71 and JCOM81, respectively. The impedance measurements were performed by Mr. Randy Mullinax, Corporate RF Engineer for the licensee, and the undersigned, using a Keysight, Model P5020A vector network analyzer; an ENI, Model 325LA, power amplifier; and a Tunwall Radio directional coupler. The impedance of each tower was measured with the other two KXYZ towers shorted to ground at the same J-Plug

location used to perform the impedance measurement. The five unused towers (KBME tower #1, #2, #3, #4, and #5) were left in the normal 1320 kilohertz detuned mode. 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 array using Expert MiniNEC Broadcast Professional (Version 23.0). A wire model consisting of 24 segments was developed for each tower. 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 and shunt capacitances were employed in a separate circuit model. The actual equivalent physical radius of each tower was used in all computer models contained in this application. Details of the modeled individual adjusted tower heights are contained in Figure 1.

The values of the shunt capacitances and lumped series inductances used in the circuit model are contained in the table of 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 the table of Figure 2. The percentage difference between the adjusted modeled tower height and the actual physical tower height and the magnitude of the lumped series inductances and shunt capacitances that were used in the circuit models are all within the tolerances set forth in the 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 DIRECTIONAL ANTENNA COMPUTER MODEL AND ANTENNA MONITOR PARAMETERS

The KXYZ theoretical daytime and nighttime directional field parameters and the licensed tower spacings and orientations were used in combination with the adjusted individual tower models to produce the daytime and nighttime directional antenna computer models. From the daytime and nighttime directional computer models, tower currents were derived that, when numerically integrated and normalized to the appropriate reference tower, are essentially identical to the theoretical relative field parameters for the KXYZ daytime and nighttime directional antenna patterns.

A tabulation of the modeled and adjusted base voltages for both the daytime and nighttime antenna systems is contained in Figure 3. The daytime and nighttime directional array operating parameters were determined from the modeled base voltages as adjusted by the circuit model and are tabulated in Figure 4 and 5, respectively. The text files containing all pertinent input and output data associated with the daytime and nighttime directional antenna computer models are contained in Appendix B and C. Note that in Appendix B and C the unused towers (#1, #2, #3, #4, and #5) are detuned in the model at their bases. Under normal operation, the unused

towers are detuned at their base using the detuning impedance determined by modeling for the adjusted tower's height. Details of the detune model are contained in Appendix D.

2.4 SAMPLE SYSTEM DESCRIPTION AND VERIFICATION MEASUREMENTS

The KXYZ antenna sampling system is comprised of: 1) Kintronic Labs, Model VSU-INT, voltage sampling devices mounted in an identical manner on the tower side of the filter circuits and series capacitor at the output to the tower feed line; 2) equal lengths of RFS LCF12-50JCT, phase stabilized, 1/2-inch, foam dielectric, coaxial cable; and 3) a Potomac Instruments, Model 1901-3, antenna monitor. Each sample line between the ATU building and the transmitter building, including excess lengths, is buried such that each cable is subjected to the same environmental conditions.

The sample lines 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*

***$R_1 + j X_1$** and **$R_2 + j X_2$** are the measured impedances at ± 45 degrees offset frequencies.*

A tabulation of the measured sample line lengths and the characteristic impedance of each line is contained in Figure 6. All sample line verification measurements were performed by Mr. Jake Wyatt, Corporate RF Engineer for the licensee, using a Keysight, Model P5020A vector network analyzer; an ENI, Model 325LA, power amplifier; and a Tunwall Radio directional coupler. As demonstrated by the measured values in Figure 6, the measured sample line lengths are within 1 electrical degree with respect to each other and the measured characteristic impedances are well within 2 ohms of each other, as required by Section 47 CFR 73.151(c)(2)(I) of the FCC 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 voltage sampling device connected. The measurement was performed at the KXYZ operating frequency of 1320 kilohertz. The measured sample line impedances with the voltage sampling devices connected are tabulated in Figure 6 under the heading “Reference Impedance Voltage Sampler Connected.” The performance of the voltage sampling units was performed by Kintronic Labs immediately prior to shipping the units. The test confirmed that the performance of the three KXYZ voltages samplers is within the manufacturer’s stated accuracy. A test report prepared by Kintronic Labs is included herein as Figure 7.

The antenna monitor that is employed by KXYZ is a Potomac Instruments, Model 1901-3 from the licensed antenna system. The antenna monitor was sent to Potomac Instruments to have filters installed and was recalibrated in June, 2021.

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 daytime and nighttime common point impedance matching networks were set for Z = 50 -j 12.6 Ohms. The transmitter output power level was adjusted for a daytime common point current of 13.30 amperes and a nighttime common point current of 7.78 amperes. This corresponds to a daytime input power of 8,845 Watts and a nighttime input power of 3,024 Watts, respectively.

4.0 REFERENCE FIELD STRENGTH MEASUREMENTS

Reference field strength measurements were performed on the KXYZ daytime and nighttime directional antenna patterns on the 133° and 217° radial bearings, corresponding to the major lobes of the pattern. In addition, reference field strength measurements were performed on the 39.5°, 89°, 175°, 261° and 310.5° radial bearings, corresponding to the daytime and nighttime directional pattern minima. Three reference field strength measurements were performed on each of the selected radial bearings.

The measurements were performed by Mr. Randy Mullinax and Mr. Nicolas Blomstrand. Mr. Blomstrand is also a Corporate RF Engineer for the licensee. A single

Potomac Instruments, Model PI-4100, Serial Number 133, last calibrated June, 2021, was used to perform the measurements.

The measured field strength value for each established reference point location is tabulated in Figure 8, Sheets 1 through 4. The tabulations contained in Figure 8 also include for each reference location; GPS coordinates (NAD83), distance from the KXYZ array center, and a description of measurement location.

5.0 CONSTRUCTION PERMIT SPECIAL CONDITIONS

The KXYZ construction permit contains several special conditions with regard to common usage of the towers at the transmitter site. The construction permit requires that before program tests are authorized: 1) sufficient data shall be submitted to show that adequate filters, traps and other equipment has been installed and adjusted to prevent interaction, intermodulation and/or generation of spurious radiation products; 2) there shall be filed with the license application copies of a firm agreement entered into by the three stations involved clearly fixing the responsibility of each with regard to the installation and maintenance of such equipment; 3) field observations shall be made to determine whether spurious emissions exist and any objectionable problems resulting therefrom shall be eliminated; and 4) all three stations shall each measure antenna or common point resistance and submit FCC Form 302 as application notifying the return to direct measurement of power.

IHM has designed, purchased, installed and adjusted filtering and detuning equipment sufficient to prevent interaction and the generation of spurious emissions. The schematic diagram of Figure 11 shows the KXYZ phasing and coupling system.

The schematic diagrams of Figure 12 show the triplexing filters and detuning circuits that have been installed at the base of each tower for this purpose.

KXYZ, KBME and KPRC are currently owned by IHM, which assumes sole responsibility for the installation and maintenance of the filtering and detuning equipment and, therefore, the requirement for the submission of an agreement is moot. Applications for License for Stations KBME and KPRC will be filed nearly concurrent with this application. Both stations have outstanding Construction Permits which will make the requirement for an application notifying the return to direct measurement of power unnecessary.

Measurements of spurious and harmonic emissions radiated by the combined operations of KXYZ, KBME and KPRC were performed by the Mr. Randy Mullinax and Mr. Nicolas Blomstrand. The measurement data confirms that all spurious and harmonic emissions generated by the common usage of the transmitter site and antennas are below the emissions limits specified in Section 73.44(b) of the Commission's Rules and Regulations. Also included in the measurements were intermodulation products that included nearby stations operating on 1070 kHz and 610 kHz. The spurious, harmonic and intermodulation product emission measurement data is tabulated in Figures 9 and 10.

6.0 SUMMARY

It is submitted that the KXYZ daytime and nighttime directional antenna systems have been properly adjusted to comply with the technical specifications contained in Construction Permit, FCC File No. BP-20210125AAC. The 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 Commission's Rules and Regulations. It is believed that the daytime and nighttime directional antenna patterns, as adjusted, fully comply with the terms of the station's FCC Authorization and all applicable FCC Rules and Regulations.

With the filing of the information contained herein and the near concurrent filing of the KBME and KPRC applications for license, it is submitted that IHM has satisfied all of the special conditions contained in the construction permit regarding the common usage of the antennas at the transmitter site by all three stations. It is requested that program test authority be issued at the full authorized daytime and nighttime power levels and that a license be issued to IHM reflecting the new MoM model derived operating parameters as contained herein and in Section III of FCC Form 302-AM.

This engineering statement, FCC Form 302-AM, Section III, and the attached figures and appendices were prepared by the undersigned or under the direct supervision of the undersigned and are believed to be true and correct.

Dated: February 6, 2023

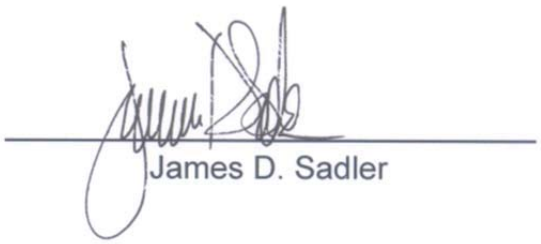


Figure 1

TOWER MODEL HEIGHT AND RADIUS

STATION KXYZ - HOUSTON, TEXAS
1320 kHz - 8.4 kW-D, 2.8 kW-N, U, DA-2
FEBRUARY, 2023

Tower	Physical Height (meters)	Modeled Height (meters)	Percent of Physical Height	Modeled Radius (meters)	Percent of Equivalent Radius
1	103.5	112.0	108.2	0.2911	100.0
2	103.5	113.5	109.6	0.2911	100.0
3	103.5	110.0	106.2	0.2911	100.0

MEASURED AND MODELED IMPEDANCES

STATION KXYZ - HOUSTON, TEXAS
1320 kHz - 8.4 kW-D, 2.8 kW-N, U, DA-2
FEBRUARY, 2023

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	422.0 -j 438.1	476.4 -j 488.1	15.0	422.1 -j 483.7	5.5	422.1 -j 438.0
2	381.5 -j 434.3	430.7 -j 492.7	15.0	381.5 -j 483.5	5.9	381.5 -j 434.3
3	493.8 -j 448.8	555.6 -j 472.0	15.0	493.6 -j 478.1	3.5	493.6 -j 448.9

[1] Measured at output J-Plug at the base of the tower with other towers used by KXYZ shorted to ground at the same location. The remaining five unused towers were all detuned at 1320 kilohertz as they are during normal operation.

Figure 2

MODELED AND ADJUSTED BASE VOLTAGES

STATION KXYZ - HOUSTON, TEXAS
1320 kHz - 8.4 kW-D, 2.8 kW-N, U, DA-2
FEBRUARY, 2023

DAYTIME PATTERN						
	Modeled Base Voltage (RMS)		Adjusted Base Voltage (RMS) (Circuit Model)		Normalized Adjusted Base Voltage	
Tower	Magnitude	Phase (degrees)	Magnitude	Phase (degrees)	Ratio	Phase (degrees)
1	1754.81	83.6	1677.39	84.7	0.888	84.2
2	2042.60	356.3	1889.61	0.5	1.000	0.0
3	1207.74	164.2	1140.20	166.0	0.603	165.5

NIGHTTIME PATTERN						
	Modeled Base Voltage (RMS)		Adjusted Base Voltage (RMS) (Circuit Model)		Normalized Adjusted Base Voltage	
Tower	Magnitude	Phase (degrees)	Magnitude	Phase (degrees)	Ratio	Phase (degrees)
1	1013.14	83.6	968.44	84.7	0.888	84.2
2	1179.30	356.3	1090.97	0.5	1.000	0.0
3	697.29	164.2	658.29	166.0	0.603	165.5

DAYTIME ANTENNA MONITOR PARAMETERS AND COMMON POINT DATA

STATION KXYZ - HOUSTON, TEXAS
1320 kHz - 8.4 kW-D, 2.8 kW-N, U, DA-2
FEBRUARY, 2023

Tower	Modeled Parameters	
	Ratio	Phase (deg)
1(NEC) - ASR#1058675	0.888	84.2
2(SEC) - ASR#1058676	1.000	0.0
3(SE) - ASR#1058677	0.603	165.5
Common Point Impedance = 50 -j 12.6 ohms Common Point Current = 13.30 amperes Antenna Input Power = 8,845 Watts		

NIGHTTIME ANTENNA MONITOR PARAMETERS AND COMMON POINT DATA

STATION KXYZ - HOUSTON, TEXAS
1320 kHz - 8.4 kW-D, 2.8 kW-N, U, DA-2
FEBRUARY, 2023

Tower	Modeled Parameters	
	Ratio	Phase (deg)
1(NEC) - ASR#1058675	0.888	84.2
2(SEC) - ASR#1058676	1.000	0.0
3(SE) - ASR#1058677	0.603	165.5
Common Point Impedance = 50 -j 12.6 ohms Common Point Current = 7.78 amperes Antenna Input Power = 3,024 Watts		

SAMPLE LINE VERIFICATION MEASUREMENTS

STATION KXYZ - HOUSTON, TEXAS
1320 kHz - 8.4 kW-D, 2.8 kW-N, U, DA-2
FEBRUARY, 2023

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 Voltage Sampler Connected[2] (Ohms)
1	1294.65	642.3	1202.2	10.14 -j 48.28	1387.1	12.01 +j 48.27	49.54	43.98 -j 120.56
2	1294.45	642.4	1202.0	10.14 -j 48.28	1386.9	11.95 +j 48.14	49.47	44.03 -j 119.08
3	1294.68	642.3	1202.2	10.12 -j 48.36	1387.2	11.91 +j 48.20	49.53	42.77 -j 117.39

[1] At this frequency, the sample line electrical length is equal to 630°.
[2] At carrier frequency (1320 kHz)

Figure 6

Figure 7

KINTRONIC LABS™

An ISO 9001 registered company

Supporting the broadcast industry with quality products and services for over 60 years

Date:	December 15, 2021
Product Report:	VSU-INT Sampling System for KXYZ in Houston, TX
Prepared By:	James Moser, Senior Staff Engineer, Kintronic Laboratories
Requested By:	Randy Mullinax, IheartMedia Technology Operations
Radio Station:	KXYZ AM Radio, Frequency 1320 KHz, Houston TX
Application:	Triplexed Array with 3 Towers Active on 1320 KHz
Shipping Date:	December 23, 2021
Serial Numbers:	12162021-1, 12162021-2, 12162021-3
Kintronic Job Number:	118488
Test RF Power:	1mW
Test Equipment:	Agilent Model E5071C Network Analyzer, S/N E5071C -ATO-57723 MY46100502
Test Equipment Calibration:	9/13/21, by Analyzer Repair Inc.
VSU Input Capacitance:	~ 25 pF
VSU Voltage Ratio:	Nominal
Temperature Range:	-50°C to 77°C

Tracking Performance:

Serial Number	Ratio	Phase	Output For 25V In	Ratio Delta	Phase Delta
12162021-1	-43.57 dB	-15.79°	.1657V	0.0%	0.0° (Reference)
12162021-2	-43.41dB	-17.17°	.1688V	1.9%	-1.38°
12162021-3	-43.44dB	-15.53°	.1682V	1.5%	+0.26°
Absolute Accuracy				±2%	±3°

Validation Signature: James B Moser Date: 6/27/22

MAILING ADDRESS: PO Box 845, Bristol, TN 37621-0845
SHIPPING ADDRESS: 144 Pleasant Grove Rd., Bluff City, TN 37618
PHONE: +1 423 878-3141 e-mail: KTL@kintronic.com website: www.kintronic.com

Tower	Serial Number
1	1216201-3
2	1216201-1
3	1216201-2

REFERENCE FIELD STRENGTH MEASUREMENTS

STATION KXYZ - HOUSTON, TEXAS
1320 kHz - 8.4 kW-D, 2.8 kW-N, U, DA-2
FEBRUARY, 2023

39.5 Degree Radial

Point Number	Distance (km)	Daytime Field (mV/m)	Nighttime Field (mV/m)	Geographic Coordinates (NAD83)		Description
				Latitude	Longitude	
1	3.80	74.20	43	29° 56' 31.8"	95° 26' 13.4"	Point is located on Sharmon Road, 20 meters south of stop sign.
2	7.93	23.70	13.9	29° 58' 14.7"	95° 24' 34.9"	Point is located on the northwest corner of intersection of Silky Leaf Drive and Desert Marigold Drive.
3	8.97	25.50	15.4	29° 58' 40.6"	95° 24' 10.1"	Point is located at #19449 Verde Trails Drive.

89 Degree Radial

Point Number	Distance (km)	Daytime Field (mV/m)	Nighttime Field (mV/m)	Geographic Coordinates (NAD83)		Description
				Latitude	Longitude	
1	4.15	209	116	29° 54' 59.1"	95° 25' 08.1"	Point is located on the manhole cover on west edge of Greens Crossing Boulevard.
2	5.63	122	73.4	29° 54' 59.7"	95° 24' 13.1"	Point is located at #14919 Wellman Lane.
3	6.60	101	57.7	29° 55' 00.2"	95° 23' 36.7"	Point is located at #14823 Estrellita Drive.

REFERENCE FIELD STRENGTH MEASUREMENTS

STATION KXYZ - HOUSTON, TEXAS
1320 kHz - 8.4 kW-D, 2.8 kW-N, U, DA-2
FEBRUARY, 2023

133 Degree Radial

Point Number	Distance (km)	Daytime Field (mV/m)	Nighttime Field (mV/m)	Geographic Coordinates (NAD83)		Description
				Latitude	Longitude	
1	3.46	271	157	29° 53' 40.6"	95° 26' 08.5"	Point is located across from #9223 Buford Lane.
2	4.52	196	114	29° 53' 17.0"	95° 25' 39.9"	Point is located at #1602 Willow Rock Road.
3	5.82	149	88.3	29° 52' 48.4"	95° 25' 04.4"	Point is located at #838 Marcolin Street.

175 Degree Radial

Point Number	Distance (km)	Daytime Field (mV/m)	Nighttime Field (mV/m)	Geographic Coordinates (NAD83)		Description
				Latitude	Longitude	
1	3.16	350	206	29° 53' 15.1"	95° 27' 32.8"	Point is located at #3302 McCrarey Drive.
2	4.27	232	135	29° 52' 39.3"	95° 27' 29.1"	Point is located at #3607 Abinger Lane.
3	6.14	158	87.7	29° 51' 38.8"	95° 27' 23.5"	Point is located at #3203 Areba Street.

REFERENCE FIELD STRENGTH MEASUREMENTS

STATION KXYZ - HOUSTON, TEXAS
1320 kHz - 8.4 kW-D, 2.8 kW-N, U, DA-2
FEBRUARY, 2023

217 Degree Radial

Point Number	Distance (km)	Daytime Field (mV/m)	Nighttime Field (mV/m)	Geographic Coordinates (NAD83)		Description
				Latitude	Longitude	
1	3.36	370	174	29° 53' 29.8"	95° 28' 58.6"	Point is located at #8602 Bold Forest Drive.
2	4.39	198	114	29° 53' 03.5"	95° 29' 21.4"	Point is located at #6714 Jasmine Arbor Lane.
3	5.59	170	100	29° 52' 32.4"	95° 29' 48.5"	Point is located at #7107 Woodland Trails Drive.

261 Degree Radial

Point Number	Distance (km)	Daytime Field (mV/m)	Nighttime Field (mV/m)	Geographic Coordinates (NAD83)		Description
				Latitude	Longitude	
1	3.74	103.0	63.7	29° 54' 37.1"	95° 30' 01.0"	Point is located at the mailbox for #7355 West Road.
2	7.77	46.0	27.3	29° 54' 17.3"	95° 32' 29.4"	Point is located at #9402 Plum Ridge Drive.
3	9.78	40.3	23.6	29° 54' 07.1"	95° 33' 43.5"	Point is located at #9646 Therrell Drive.

REFERENCE FIELD STRENGTH MEASUREMENTS

STATION KXYZ - HOUSTON, TEXAS
1320 kHz - 8.4 kW-D, 2.8 kW-N, U, DA-2
FEBRUARY, 2023

310.5 Degree Radial

Point Number	Distance (km)	Daytime Field (mV/m)	Nighttime Field (mV/m)	Geographic Coordinates (NAD83)		Description
				Latitude	Longitude	
1	3.42	84.0	49.1	29° 56' 08.6"	95° 29' 20.0"	Point is located at #6929 Greenyard Drive.
2	4.79	63.2	37.10	29° 56' 37.3"	95° 29' 59.1"	Point is located at #5326 Oak Falls Drive.
3	5.97	60.0	35.20	29° 57' 02.2"	95° 30' 32.6"	Point is located at #6418 Castle Lane Drive.

Figure 8
Sheet 4 of 4

MEASURED SPURIOUS AND HARMONIC EMISSIONS
DAYTIME OPERATION
STATION KXYZ - HOUSTON, TEXAS
1320 kHz - 8.4 kW-D, 2.8 kW-N, U, DA-2
FEBRUARY, 2023

Measured Attenuation

Emission	Frequency (kHz)	Field Strength (mV/m)	Reference Carrier	Below Carrier (dBc)	FCC Limit (dBc)
F1	790	1050	- - -	- - -	- - -
F2	950	804	- - -	- - -	- - -
F3	1320	1500	- - -	- - -	- - -
F4	1070	210	- - -	- - -	- - -
F5	610	42.5	- - -	- - -	- - -
2F2-F3	580	0.022	-91.3	F2	-80.0
2F1-F2	630	0.109	(Note 1)	F1	-80.0
2F2-F1	1110	1.35	(Note 1)	F2	-80.0
F1-F2+F3	1160	0.024	-90.5	F2	-80.0
F1+F5	1400	0.431	(Note 1)	F1	-80.0
-F1+F2+F3	1480	2.17	(Note 1)	F2	-80.0
F2+F5	1560	0.953	(Note 1)	F2	-80.0
2F1	1580	0.066	(Note 2)	F1	-80.0
2F3-F2	1690	0.018	-98.4	F3	-80.0
F1+F2	1740	0.035	-89.5	F2	-80.0
2F3-F1	1850	0.025	-95.6	F3	-80.0
F1+F4	1860	0.029	-91.2	F1	-80.0
2F2	1900	0.019	-92.5	F2	-80.0
F3+F5	1930	0.011	-102.7	F3	-80.0
F2+F4	2020	0.013	-95.8	F2	-80.0
F1+F3	2110	0.052	-86.1	F1	-80.0
F5+2F1	2190	0.011	-99.6	F1	-80.0
F2+F3	2270	0.075	-80.6	F2	-80.0
F1+F2+F5	2350	0.01	-98.1	F2	-80.0
3F1	2370	0.025	-92.5	F1	-80.0
F3+F4	2390	0.025	-95.6	F3	-80.0
F5+2F2	2510	0.011	-97.3	F2	-80.0
F2+2F1	2530	0.032	-90.3	F1	-80.0
2F3	2640	0.095	-84.0	F3	-80.0
F4+2F1	2650	0.011	-99.6	F1	-80.0

Measured Attenuation

Emission	Frequency (kHz)	Field Strength (mV/m)	Reference Carrier	Below Carrier (dBc)	FCC Limit (dBc)
F1+2F2	2690	0.018	-93.0	F2	-80.0
F1+F3+F5	2720	0.01	-100.4	F1	-80.0
F1+F2+F4	2810	0.01	-98.1	F2	-80.0
3F2	2850	0.016	-94.0	F2	-80.0
F2+F3+F5	2880	0.01	-98.1	F2	-80.0
F3+2F1	2900	0.027	-91.8	F1	-80.0
F4+2F2	2970	0.01	-98.1	F2	-80.0
F1+F2+F3	3060	0.03	-88.6	F2	-80.0
F1+F3+F4	3180	0.011	-99.6	F1	-80.0
F3+2F2	3220	0.033	-87.7	F2	-80.0
F5+2F3	3250	0.058	-88.3	F3	-80.0
F2+F3+F4	3340	0.01	-98.1	F2	-80.0
F1+2F3	3430	0.043	-90.9	F3	-80.0
F2+2F3	3590	0.072	-86.4	F3	-80.0
F4+2F3	3710	0.013	-101.2	F3	-80.0
3F3	3960	0.084	-85.0	F3	-80.0

Note 1 - Signal from another station, no audio from reference station(s) observed

Note 2 - Splatter from strong local station on adjacent frequency, no audio from reference station(s) observed

MEASURED SPURIOUS AND HARMONIC EMISSIONS
NIGHTTIME OPERATION
STATION KXYZ - HOUSTON, TEXAS
1320 kHz - 8.4 kW-D, 2.8 kW-N, U, DA-2
FEBRUARY, 2023

Measured Attenuation

Emission	Frequency (kHz)	Field Strength (mV/m)	Reference Carrier	Below Carrier (dBc)	FCC Limit (dBc)
F1	790	1860	- - -	- - -	- - -
F2	950	920	- - -	- - -	- - -
F3	1320	870	- - -	- - -	- - -
F4	1070	162	- - -	- - -	- - -
F5	610	10.4	- - -	- - -	- - -
2F2-F3	580	0.023	-92.0	F2	-79.3
2F1-F2	630	0.109	(Note 1)	F1	-80.0
2F2-F1	1110	1.22	(Note 1)	F2	-79.3
F1-F2+F3	1160	0.025	-91.3	F2	-79.3
F1+F5	1400	0.39	(Note 1)	F1	-80.0
-F1+F2+F3	1480	2.06	(Note 1)	F2	-79.3
F2+F5	1560	0.881	(Note 1)	F2	-79.3
2F1	1580	0.629	(Note 2)	F1	-80.0
2F3-F2	1690	0.017	-94.2	F3	-77.5
F1+F2	1740	0.036	-88.1	F2	-79.3
2F3-F1	1850	0.022	-91.9	F3	-77.5
F1+F4	1860	0.019	-99.8	F1	-80.0
2F2	1900	0.016	-95.2	F2	-79.3
F3+F5	1930	0.011	-98.0	F3	-77.5
F2+F4	2020	0.014	-81.3	F2	-79.3
F1+F3	2110	0.078	-87.5	F1	-80.0
F5+2F1	2190	0.011	-104.6	F1	-80.0
F2+F3	2270	0.062	-83.4	F2	-79.3
F1+F2+F5	2350	0.01	-99.3	F2	-79.3
3F1	2370	0.089	-86.4	F1	-80.0
F3+F4	2390	0.023	-91.6	F3	-77.5
F5+2F2	2510	0.011	-98.4	F2	-79.3
F2+2F1	2530	0.065	-89.1	F1	-80.0
2F3	2640	0.08	-80.7	F3	-77.5
F4+2F1	2650	0.017	-100.8	F1	-80.0

Measured Attenuation

Emission	Frequency (kHz)	Field Strength (mV/m)	Reference Carrier	Below Carrier (dBc)	FCC Limit (dBc)
F1+2F2	2690	0.035	-88.4	F2	-79.3
F1+F3+F5	2720	0.011	-104.6	F1	-80.0
F1+F2+F4	2810	0.014	-81.3	F2	-79.3
3F2	2850	0.015	-95.8	F2	-79.3
F2+F3+F5	2880	0.011	-98.4	F2	-79.3
F3+2F1	2900	0.046	-92.1	F1	-80.0
F4+2F2	2970	0.01	-99.3	F2	-79.3
F1+F2+F3	3060	0.043	-86.6	F2	-79.3
F1+F3+F4	3180	0.019	-99.8	F1	-80.0
F3+2F2	3220	0.029	-90.0	F2	-79.3
F5+2F3	3250	0.059	-83.4	F3	-77.5
F2+F3+F4	3340	0.013	-81.9	F2	-79.3
F1+2F3	3430	0.067	-82.3	F3	-77.5
F2+2F3	3590	0.036	-87.7	F3	-77.5
F4+2F3	3710	0.038	-87.2	F3	-77.5
3F3	3960	0.022	-91.9	F3	-77.5

Note 1 - Signal from another station, no audio from reference station(s) observed

Note 2 - Splatter from strong local station on adjacent frequency, no audio from reference station(s) observed

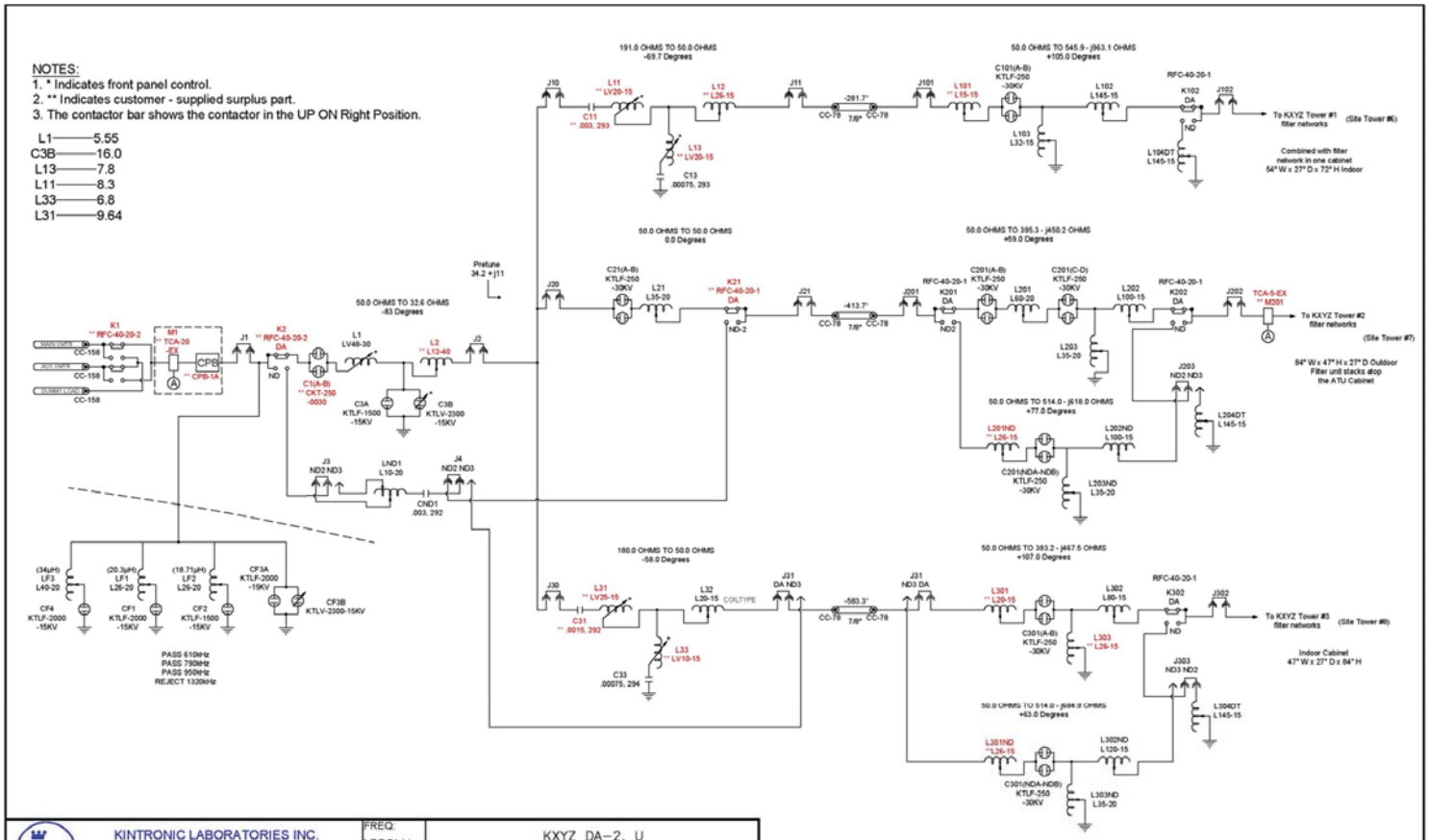

NOTES:
1. * Indicates front panel control.
2. ** Indicates customer - supplied surplus part.
3. The contactor bar shows the contactor in the UP ON Right Position.
L1——5.55
C3B——16.0
L13——7.8
L11——8.3
L33——6.8
L31——9.64
191.0 OHMS TO 50.0 OHMS -69.7 Degrees
50.0 OHMS TO 545.9 - j963.1 OHMS +105.0 Degrees
50.0 OHMS TO 50.0 OHMS 0.0 Degrees
50.0 OHMS TO 395.3 - j450.2 OHMS +59.0 Degrees
50.0 OHMS TO 32.6 OHMS -83 Degrees
50.0 OHMS TO 514.0 - j618.0 OHMS +77.0 Degrees
180.0 OHMS TO 50.0 OHMS -58.0 Degrees
50.0 OHMS TO 383.2 - j467.5 OHMS +107.0 Degrees
50.0 OHMS TO 514.9 - j589.9 OHMS +63.0 Degrees
Pretune 34.2 +j11
To KXYZ Tower #1 filter networks (Site Tower #6)
To KXYZ Tower #2 filter networks (Site Tower #7)
To KXYZ Tower #3 filter networks (Site Tower #8)
Combined with filter network in one cabinet 54" W x 27" D x 72" H Indoor
84" W x 47" H x 27" D Outdoor Filter unit stacks atop the ATU Cabinet
Indoor Cabinet 47" W x 27" D x 84" H
PASS 610kHz
PASS 790kHz
PASS 950kHz
REJECT 1320kHz
KINTRONIC LABORATORIES INC.
BLUFF CITY, TN.
COPYRIGHT 2021 KINTRONIC LABORATORIES INC.
FREQ: 1320kHz
POWER: 8.4kW-D 2.8kW-N
KXYZ DA-2, U
PHASING & COUPLING SCHEMATIC
HOUSTON, TX
REV. 06
REV. DESCRIPTION: Label & Note Change
REV. DATE: 12/9/2021
JOB NO. 118488
DESIGNED: C.T.Jones
DWG NO. 12337-RFS-11
REF DWG.
DATE: 07/8/2021
DRAWN: N.Ormes
APPROVED: B.Cox
THE CONTENTS OF THIS DRAWING ARE THE INTELLECTUAL PROPERTY OF KINTRONIC LABS, INC. AND ARE NOT TO BE DISTRIBUTED TO ANY THIRD PARTY WITHOUT THE WRITTEN CONSENT OF KINTRONIC LABS, INC.

Figure 11

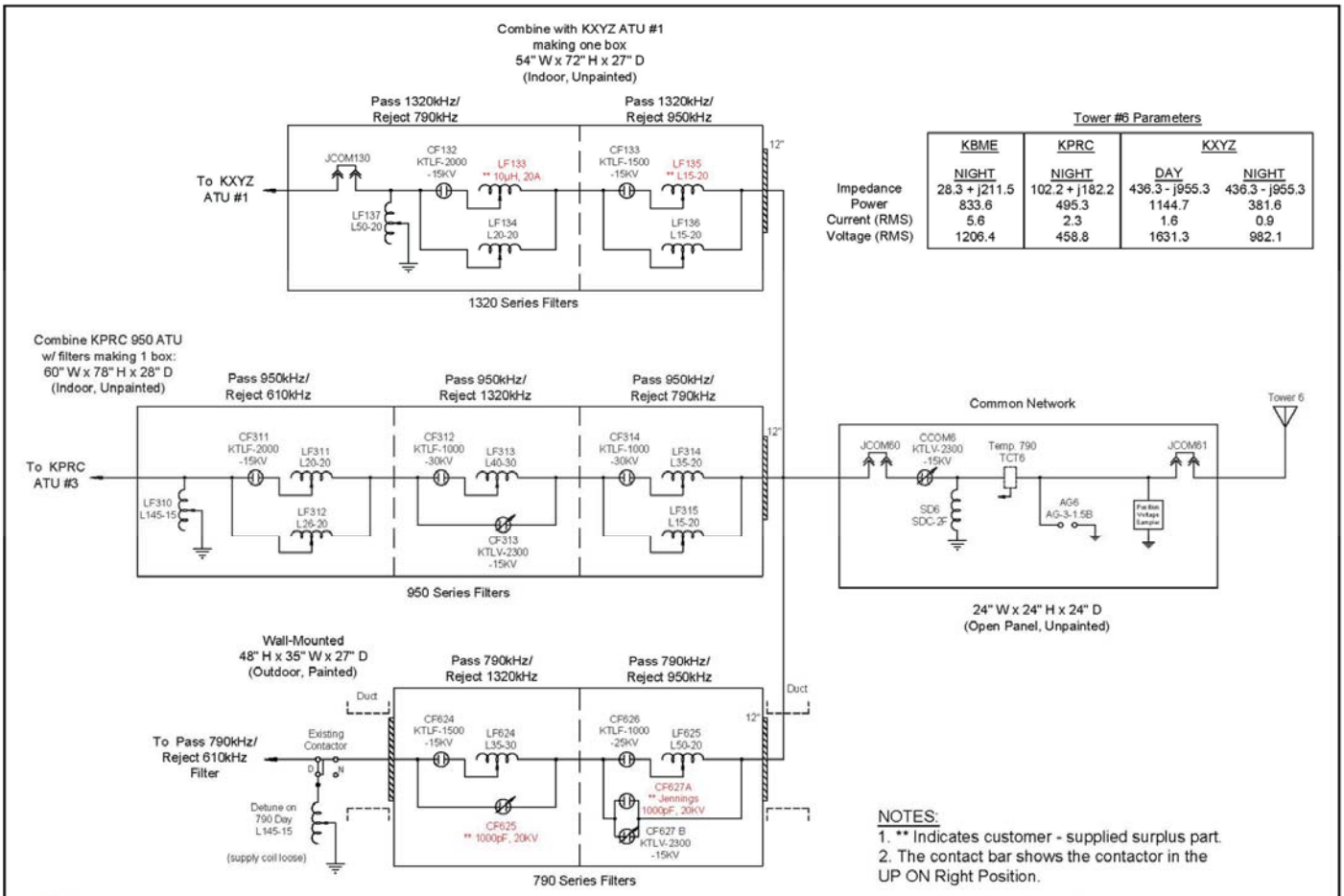
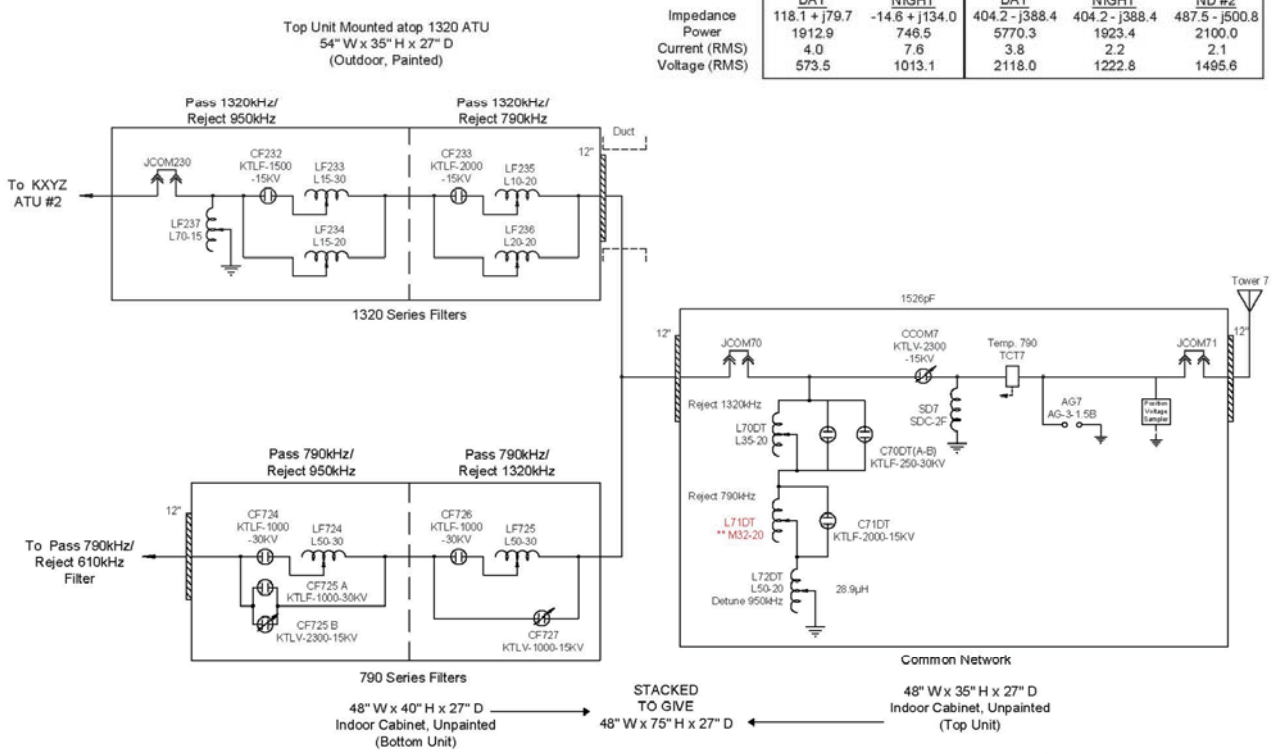


Figure 12
Sheet 1 of 3

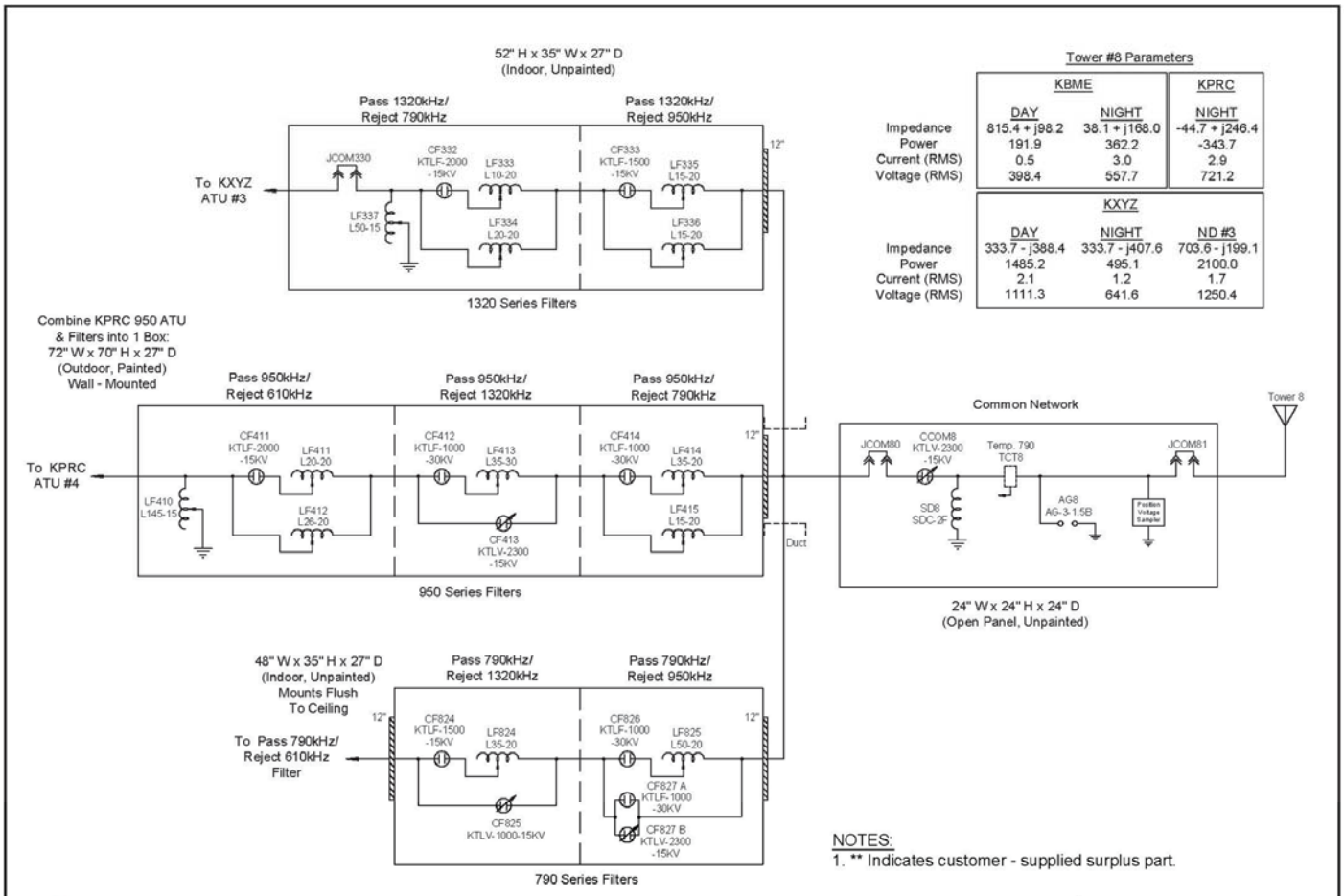
NOTES:
1. ** Indicates customer - supplied surplus part.

Tower #7 Parameters

	KBME		KXYZ		
	DAY	NIGHT	DAY	NIGHT	ND #2
Impedance	118.1 + j79.7	-14.6 + j134.0	404.2 - j388.4	404.2 - j388.4	487.5 - j500.8
Power	1912.9	746.5	5770.3	1923.4	2100.0
Current (RMS)	4.0	7.6	3.8	2.2	2.1
Voltage (RMS)	573.5	1013.1	2118.0	1222.8	1495.6



KINTRONIC LABORATORIES INC. BLUFF CITY, TN.				FREQ: Varies POWER: Varies	KPRC KXYZ onto KBME Tower #7 RF SCHEMATIC HOUSTON, TX
REV.: 05	REV. DESCRIPTION: Removed 1320 Voltage Sampler & Edited Com. Network Pos. Voltage Sampler	REV. DATE: 24-OCT-22	JOB NO: 118488	DESIGNED: B.Cox	
DWG NO: 12337-RFS-07	REF DWG.	DATE: 07-JULY-21	DRAWN: N.Ormes	APPROVED:	



KINTRONIC LABORATORIES INC. BLUFF CITY, TN.				FREQ: Varies POWER: Varies	KPRC KXYZ onto KBME Tower #8 RF SCHEMATIC HOUSTON, TX
REV.: 06	REV. DESCRIPTION: Removed 1320 Voltage Sampler & Edited Com. Network Pos. Voltage Sampler	REV. DATE: 24-OCT-22	JOB NO: 118488	DESIGNED: B.Cox	
DWG NO: 12337-RFS-08	REF DWG.	DATE: 07-JULY-21	DRAWN: N.Ormes	APPROVED:	

APPENDIX A

INDIVIDUAL TOWER MODEL

IMPEDANCE – TOWER #1
normalization = 50.

freq (MHz)	resist (ohms)	react (ohms)	imped (ohms)	phase (deg)	VSWR	S11 dB	S12 dB
source = 1; node 121, sector 1							
1.32	476.42	-488.08	682.05	314.3	19.583	-.88787	-7.3307

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	.2911	24
		0	0	164.1		
2	none	167.1	175.	0	.2911	24
		167.1	175.	164.1		
3	none	334.2	175.	0	.2911	24
		334.2	175.	164.1		
4	none	501.3	175.	0	.2911	24
		501.3	175.	164.1		
5	none	324.2	45.	0	.2911	24
		324.2	45.	164.1		
6	none	251.7	75.6	0	.2911	24
		251.7	75.6	177.52		
7	none	278.4	111.9	0	.2911	24
		278.4	111.9	179.92		
8	none	384.	134.7	0	.2911	24
		384.	134.7	174.36		

Number of wires = 8
current nodes = 192

	minimum wire	minimum value	maximum wire	maximum value
Individual wires				
segment length	1	6.8375	7	7.49667
radius	1	.2911	1	.2911

ELECTRICAL DESCRIPTION – TOWER #1
Frequencies (MHz)

no.	frequency lowest	step	no. of steps	segment length (wavelengths) minimum	maximum
1	1.32	0	1	.0189931	.0208241

Sources

source	node	sector	magnitude	phase	type
1	121	1	1.	0	voltage

Lumped loads

load	node	resistance (ohms)	reactance (ohms)	inductance (mH)	capacitance (uF)	passive circuit
1	1	1.E-03	0	.0275	0	0
2	25	1.E-03	0	.0275	0	0
3	49	1.E-03	0	.0275	0	0
4	73	1.E-03	0	.0275	0	0
5	97	1.E-03	0	.0275	0	0
6	121	1.E-03	0	0	0	0
7	145	1.E-03	49.48	0	0	0
8	169	1.E-03	29.3	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 145, sector 1							
1.32	430.74	-492.66	654.41	311.2	19.95	-.87148	-7.4037

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	.2911	24
		0	0	164.1		
2	none	167.1	175.	0	.2911	24
		167.1	175.	164.1		
3	none	334.2	175.	0	.2911	24
		334.2	175.	164.1		
4	none	501.3	175.	0	.2911	24
		501.3	175.	164.1		
5	none	324.2	45.	0	.2911	24
		324.2	45.	164.1		
6	none	251.7	75.6	0	.2911	24
		251.7	75.6	177.52		
7	none	278.4	111.9	0	.2911	24
		278.4	111.9	179.92		
8	none	384.	134.7	0	.2911	24
		384.	134.7	174.36		

Number of wires = 8
current nodes = 192

	minimum wire	minimum value	maximum wire	maximum value
Individual wires				
segment length	1	6.8375	7	7.49667
radius	1	.2911	1	.2911

ELECTRICAL DESCRIPTION – TOWER #2
Frequencies (MHz)

no.	frequency lowest	step	no. of steps	segment length (wavelengths) minimum	maximum
1	1.32	0	1	.0189931	.0208241

Sources

source	node	sector	magnitude	phase	type
1	145	1	1.	0	voltage

Lumped loads

load	node	resistance (ohms)	reactance (ohms)	inductance (mH)	capacitance (uF)	passive circuit
1	1	1.E-03	0	.0275	0	0
2	25	1.E-03	0	.0275	0	0
3	49	1.E-03	0	.0275	0	0
4	73	1.E-03	0	.0275	0	0
5	97	1.E-03	0	.0275	0	0
6	121	1.E-03	45.96	0	0	0
7	145	1.E-03	0	0	0	0
8	169	1.E-03	29.3	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 169, sector 1							
1.32	555.6	-472.03	729.05	319.6	19.171	-.90699	-7.2474

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	.2911	24
		0	0	164.1		
2	none	167.1	175.	0	.2911	24
		167.1	175.	164.1		
3	none	334.2	175.	0	.2911	24
		334.2	175.	164.1		
4	none	501.3	175.	0	.2911	24
		501.3	175.	164.1		
5	none	324.2	45.	0	.2911	24
		324.2	45.	164.1		
6	none	251.7	75.6	0	.2911	24
		251.7	75.6	177.52		
7	none	278.4	111.9	0	.2911	24
		278.4	111.9	179.92		
8	none	384.	134.7	0	.2911	24
		384.	134.7	174.36		

Number of wires = 8
current nodes = 192

	minimum wire	minimum value	maximum wire	maximum value
Individual wires				
segment length	1	6.8375	7	7.49667
radius	1	.2911	1	.2911

ELECTRICAL DESCRIPTION – TOWER #3
Frequencies (MHz)

no.	frequency lowest	step	no. of steps	segment length (wavelengths) minimum	maximum
1	1.32	0	1	.0189931	.0208241

Sources

source	node	sector	magnitude	phase	type
1	169	1	1.	0	voltage

Lumped loads

load	node	resistance (ohms)	reactance (ohms)	inductance (mH)	capacitance (uF)	passive circuit
1	1	1.E-03	0	.0275	0	0
2	25	1.E-03	0	.0275	0	0
3	49	1.E-03	0	.0275	0	0
4	73	1.E-03	0	.0275	0	0
5	97	1.E-03	0	.0275	0	0
6	121	1.E-03	45.96	0	0	0
7	145	1.E-03	49.48	0	0	0
8	169	1.E-03	0	0	0	0

APPENDIX B

DAYTIME DIRECTIONAL ARRAY MODEL

IMPEDANCE – DAYTIME OPERATION
normalization = 50.

freq (MHz)	resist (ohms)	react (ohms)	imped (ohms)	phase (deg)	VSWR	S11 dB	S12 dB
source = 1; node 121, sector 1							
1.32	449.11	-978.34	1,076.5	294.7	51.698	-.33607	-11.281
source = 2; node 145, sector 1							
1.32	344.41	-363.4	500.67	313.5	14.634	-1.189	-6.2071
source = 3; node 169, sector 1							
1.32	236.14	-421.48	483.12	299.3	19.93	-.87237	-7.3997

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

wire	caps	Distance	Angle	Z	radius	segs
1	none	0	0	0	.2911	24
		0	0	164.1		
2	none	167.1	175.	0	.2911	24
		167.1	175.	164.1		
3	none	334.2	175.	0	.2911	24
		334.2	175.	164.1		
4	none	501.3	175.	0	.2911	24
		501.3	175.	164.1		
5	none	324.2	45.	0	.2911	24
		324.2	45.	164.1		
6	none	251.7	75.6	0	.2911	24
		251.7	75.6	177.52		
7	none	278.4	111.9	0	.2911	24
		278.4	111.9	179.92		
8	none	384.	134.7	0	.2911	24
		384.	134.7	174.36		

Number of wires = 8
current nodes = 192

	minimum		maximum	
Individual wires	wire	value	wire	value
segment length	1	6.8375	7	7.49667
radius	1	.2911	1	.2911

ELECTRICAL DESCRIPTION – DAYTIME OPERATION
Frequencies (MHz)

	frequency		no. of	segment length (wavelengths)	
no.	lowest	step	steps	minimum	maximum
1	1.32	0	1	.0189931	.0208241

Sources

source	node	sector	magnitude	phase	type
1	121	1	2,481.44	83.6	voltage
2	145	1	2,888.42	356.3	voltage
3	169	1	1,707.84	164.2	voltage

Lumped loads

load	node	resistance (ohms)	reactance (ohms)	inductance (mH)	capacitance (uF)	passive circuit
1	1	1.E-03	0	.0275	0	0
2	25	1.E-03	0	.0275	0	0
3	49	1.E-03	0	.0275	0	0
4	73	1.E-03	0	.0275	0	0
5	97	1.E-03	0	.0275	0	0
6	121	1.E-03	0	0	0	0
7	145	1.E-03	0	0	0	0
8	169	1.E-03	0	0	0	0

RMS CURRENT – DAYTIME OPERATION
Frequency = 1.32 MHz
Input power = 8,400. watts
Efficiency = 100. %
coordinates in degrees

current no.	X	Y	Z	mag (amps)	phase (deg)	real (amps)	imaginary (amps)
GND	0	0	0	1.28186	218.	-1.01008	-.789238
2	0	0	6.8375	1.04201	218.	-.82081	-.641917
3	0	0	13.675	.87712	218.1	-.690063	-.541436
4	0	0	20.5125	.726803	218.3	-.570274	-.450589
5	0	0	27.35	.585386	218.7	-.456996	-.365829
6	0	0	34.1875	.451239	219.3	-.34897	-.28607
7	0	0	41.025	.324327	220.6	-.246165	-.211166
8	0	0	47.8625	.205414	223.5	-.149061	-.141335
9	0	0	54.7	.0965857	232.8	-.0583623	-.0769587
10	0	0	61.5375	.0311867	323.7	.0251319	-.0184662
11	0	0	68.375	.106101	18.5	.100602	.033714
12	0	0	75.2125	.185055	25.3	.167256	.0791889
13	0	0	82.05	.253321	27.7	.224357	.117623
14	0	0	88.8875	.309362	28.7	.271252	.148753
15	0	0	95.725	.352423	29.3	.307381	.172393
16	0	0	102.563	.382005	29.6	.332289	.188446
17	0	0	109.4	.397784	29.7	.345633	.196901
18	0	0	116.238	.399587	29.7	.347178	.197832
19	0	0	123.075	.387372	29.6	.33679	.191388
20	0	0	129.913	.3612	29.5	.314417	.177784
21	0	0	136.75	.321178	29.3	.280036	.157273
22	0	0	143.588	.267345	29.1	.233563	.130085
23	0	0	150.425	.199385	28.9	.174589	.0962974
24	0	0	157.263	.115849	28.6	.101705	.0554702
END	0	0	164.1	0	0	0	0
GND	-166.464	-14.5637	0	1.20985	202.3	-1.11922	-.459423
26	-166.464	-14.5637	6.8375	.983478	202.3	-.909665	-.373817
27	-166.464	-14.5637	13.675	.827849	202.4	-.76526	-.315772
28	-166.464	-14.5637	20.5125	.685971	202.6	-.633293	-.26362
29	-166.464	-14.5637	27.35	.552494	202.9	-.508827	-.215278
30	-166.464	-14.5637	34.1875	.425871	203.5	-.390431	-.170088
31	-166.464	-14.5637	41.025	.306061	204.7	-.278042	-.127929
32	-166.464	-14.5637	47.8625	.193746	207.3	-.172149	-.088894
33	-166.464	-14.5637	54.7	.0906935	215.9	-.073484	-.0531547
34	-166.464	-14.5637	61.5375	.0270253	309.3	.0171187	-.0209121
35	-166.464	-14.5637	68.375	.0991054	4.4	.0988105	7.64E-03
36	-166.464	-14.5637	75.2125	.173811	10.7	.170777	.0323347
37	-166.464	-14.5637	82.05	.238249	12.9	.23227	.0530393
38	-166.464	-14.5637	88.8875	.291095	13.8	.282636	.0696669
39	-166.464	-14.5637	95.725	.331668	14.3	.321326	.0821793
40	-166.464	-14.5637	102.563	.359513	14.6	.347912	.0905889

41	-166.464	-14.5637	109.4	.374335	14.7	.36209	.0949596
42	-166.464	-14.5637	116.238	.375982	14.7	.363676	.095405
43	-166.464	-14.5637	123.075	.364425	14.6	.352599	.0920823
44	-166.464	-14.5637	129.913	.339731	14.5	.328876	.0851895
45	-166.464	-14.5637	136.75	.302014	14.4	.292567	.0749449
46	-166.464	-14.5637	143.588	.251325	14.2	.243668	.0615672
47	-166.464	-14.5637	150.425	.187381	14.	.181845	.0452095
48	-166.464	-14.5637	157.263	.108837	13.7	.105736	.0257962
END	-166.464	-14.5637	164.1	0	0	0	0
GND	-332.928	-29.1275	0	1.03494	79.3	.19254	1.01687
50	-332.928	-29.1275	6.8375	.841101	79.3	.156105	.826488
51	-332.928	-29.1275	13.675	.707399	79.4	.130118	.695329
52	-332.928	-29.1275	20.5125	.5851	79.6	.105546	.575501
53	-332.928	-29.1275	27.35	.469656	80.	.0815889	.462515
54	-332.928	-29.1275	34.1875	.359795	80.7	.058072	.355077
55	-332.928	-29.1275	41.025	.255551	82.1	.0350741	.253132
56	-332.928	-29.1275	47.8625	.157644	85.3	.0127858	.157125
57	-332.928	-29.1275	54.7	.0682594	97.2	-8.55E-03	.0677224
58	-332.928	-29.1275	61.5375	.0320211	206.6	-.0286415	-.0143184
59	-332.928	-29.1275	68.375	.100066	241.8	-.0472109	-.0882293
60	-332.928	-29.1275	75.2125	.166083	247.3	-.0639592	-.153274
61	-332.928	-29.1275	82.05	.223087	249.4	-.0785978	-.208783
62	-332.928	-29.1275	88.8875	.269919	250.3	-.0908484	-.254171
63	-332.928	-29.1275	95.725	.30592	250.8	-.100452	-.288957
64	-332.928	-29.1275	102.563	.330621	251.1	-.107169	-.312771
65	-332.928	-29.1275	109.4	.343697	251.2	-.110781	-.325354
66	-332.928	-29.1275	116.238	.344949	251.2	-.111098	-.326569
67	-332.928	-29.1275	123.075	.334289	251.2	-.107948	-.31638
68	-332.928	-29.1275	129.913	.311713	251.1	-.101179	-.294835
69	-332.928	-29.1275	136.75	.277262	250.9	-.0906398	-.262028
70	-332.928	-29.1275	143.588	.230914	250.7	-.0761491	-.217997
71	-332.928	-29.1275	150.425	.172337	250.5	-.0574079	-.162495
72	-332.928	-29.1275	157.263	.10022	250.3	-.0337705	-.0943592
END	-332.928	-29.1275	164.1	0	0	0	0
GND	-499.392	-43.6912	0	1.0041	317.7	.742866	-.675549
74	-499.392	-43.6912	6.8375	.815993	317.7	.603966	-.548698
75	-499.392	-43.6912	13.675	.686149	317.8	.508701	-.460461
76	-499.392	-43.6912	20.5125	.567287	318.1	.422062	-.379049
77	-499.392	-43.6912	27.35	.455003	318.5	.340746	-.30153
78	-499.392	-43.6912	34.1875	.348071	319.3	.263771	-.227109
79	-499.392	-43.6912	41.025	.246546	320.8	.191052	-.155834
80	-499.392	-43.6912	47.8625	.151184	324.4	.122861	-.0881006
81	-499.392	-43.6912	54.7	.0644516	337.7	.0596265	-.0244682
82	-499.392	-43.6912	61.5375	.0344827	86.9	1.84E-03	.0344338
83	-499.392	-43.6912	68.375	.101184	119.6	-.0500218	.087955
84	-499.392	-43.6912	75.2125	.165728	125.2	-.0954814	.135459
85	-499.392	-43.6912	82.05	.221559	127.3	-.13413	.176345
86	-499.392	-43.6912	88.8875	.2675	128.3	-.165619	.210063
87	-499.392	-43.6912	95.725	.302875	128.8	-.189672	.236131
88	-499.392	-43.6912	102.563	.3272	129.	-.206096	.254134
89	-499.392	-43.6912	109.4	.340132	129.2	-.21478	.263741
90	-499.392	-43.6912	116.238	.341445	129.2	-.215691	.264693
91	-499.392	-43.6912	123.075	.331025	129.1	-.208877	.256804
92	-499.392	-43.6912	129.913	.308837	129.	-.194443	.239943
93	-499.392	-43.6912	136.75	.274884	128.9	-.172525	.214001
94	-499.392	-43.6912	143.588	.229107	128.7	-.143236	.178812
95	-499.392	-43.6912	150.425	.171136	128.5	-.106502	.133958
96	-499.392	-43.6912	157.263	.099618	128.2	-.0616641	.0782386
END	-499.392	-43.6912	164.1	0	0	0	0
GND	229.244	-229.244	0	.790876	43.7	.572194	.545966

98	229.244	-229.244	6.8375	.642726	43.7	.464871	.443838
99	229.244	-229.244	13.675	.540486	43.7	.390493	.373684
100	229.244	-229.244	20.5125	.446916	43.9	.322132	.309782
101	229.244	-229.244	27.35	.358544	44.1	.257297	.249705
102	229.244	-229.244	34.1875	.274395	44.6	.195306	.192738
103	229.244	-229.244	41.025	.19447	45.6	.136184	.138826
104	229.244	-229.244	47.8625	.119227	47.7	.0802475	.0881777
105	229.244	-229.244	54.7	.0497161	55.8	.0279447	.0411191
106	229.244	-229.244	61.5375	.0203204	185.6	-.0202238	-1.98E-03
107	229.244	-229.244	68.375	.075654	212.6	-.0637477	-.0407401
108	229.244	-229.244	75.2125	.126601	216.2	-.102137	-.0748063
109	229.244	-229.244	82.05	.170276	217.6	-.134939	-.103852
110	229.244	-229.244	88.8875	.206028	218.3	-.161759	-.1276
111	229.244	-229.244	95.725	.233415	218.7	-.18226	-.145821
112	229.244	-229.244	102.563	.252111	218.9	-.196181	-.158345
113	229.244	-229.244	109.4	.261891	219.1	-.203329	-.165057
114	229.244	-229.244	116.238	.262628	219.2	-.20359	-.165904
115	229.244	-229.244	123.075	.25428	219.2	-.196914	-.160882
116	229.244	-229.244	129.913	.236874	219.3	-.183305	-.150028
117	229.244	-229.244	136.75	.210472	219.3	-.162797	-.1334
118	229.244	-229.244	143.588	.175092	219.4	-.135391	-.111025
119	229.244	-229.244	150.425	.13052	219.4	-.100908	-.0827832
120	229.244	-229.244	157.263	.0758057	219.4	-.0586037	-.0480844
END	229.244	-229.244	164.1	0	0	0	0
GND	62.5952	-243.792	0	1.62996	149.	-1.39675	.840156
122	62.5952	-243.792	7.39667	.678524	82.6	.0875738	.672849
123	62.5952	-243.792	14.7933	1.22033	27.1	1.08603	.55655
124	62.5952	-243.792	22.19	2.01256	12.9	1.96142	.450782
125	62.5952	-243.792	29.5867	2.77066	7.3	2.74824	.351731
126	62.5952	-243.792	36.9833	3.46568	4.3	3.45604	.258381
127	62.5952	-243.792	44.38	4.08886	2.4	4.0853	.170749
128	62.5952	-243.792	51.7767	4.63403	1.1	4.63317	.089244
129	62.5952	-243.792	59.1733	5.09565	.2	5.09563	.0144258
130	62.5952	-243.792	66.57	5.46882	359.4	5.46856	-.0531072
131	62.5952	-243.792	73.9667	5.74939	358.9	5.74829	-.112782
132	62.5952	-243.792	81.3633	5.93422	358.4	5.93195	-.164087
133	62.5952	-243.792	88.76	6.02123	358.	6.01769	-.206597
134	62.5952	-243.792	96.1567	6.00958	357.7	6.00479	-.239985
135	62.5952	-243.792	103.553	5.89966	357.4	5.89375	-.264034
136	62.5952	-243.792	110.95	5.69308	357.2	5.68626	-.278641
137	62.5952	-243.792	118.347	5.39269	357.	5.38522	-.283814
138	62.5952	-243.792	125.743	5.00243	356.8	4.99461	-.279673
139	62.5952	-243.792	133.14	4.52717	356.6	4.51933	-.266435
140	62.5952	-243.792	140.537	3.97247	356.5	3.96494	-.244399
141	62.5952	-243.792	147.933	3.34401	356.3	3.33716	-.213909
142	62.5952	-243.792	155.33	2.64676	356.2	2.64095	-.175282
143	62.5952	-243.792	162.727	1.8825	356.1	1.8781	-.128635
144	62.5952	-243.792	170.123	1.04353	356.	1.04095	-.0733999
END	62.5952	-243.792	177.52	0	0	0	0
GND	-103.84	-258.31	0	4.07938	42.8	2.99345	2.77138
146	-103.84	-258.31	7.49667	3.04407	19.5	2.8687	1.01829
147	-103.84	-258.31	14.9933	2.76613	356.4	2.76072	-.17298
148	-103.84	-258.31	22.49	2.91309	335.1	2.64219	-1.22676
149	-103.84	-258.31	29.9867	3.32746	319.	2.51126	-2.18302
150	-103.84	-258.31	37.4833	3.86327	307.8	2.36824	-3.05226
151	-103.84	-258.31	44.98	4.42782	300.	2.21446	-3.83429
152	-103.84	-258.31	52.4767	4.96838	294.4	2.05167	-4.52498
153	-103.84	-258.31	59.9733	5.45383	290.2	1.88197	-5.11883
154	-103.84	-258.31	67.47	5.86436	286.9	1.70764	-5.61022
155	-103.84	-258.31	74.9667	6.18657	284.3	1.53105	-5.99413

156	-103.84	-258.31	82.4633	6.41123	282.2	1.35463	-6.26648
157	-103.84	-258.31	89.96	6.5321	280.4	1.18078	-6.42449
158	-103.84	-258.31	97.4567	6.54545	278.9	1.01189	-6.46676
159	-103.84	-258.31	104.953	6.44966	277.6	.850176	-6.39338
160	-103.84	-258.31	112.45	6.24509	276.4	.697791	-6.20598
161	-103.84	-258.31	119.947	5.93382	275.4	.556672	-5.90765
162	-103.84	-258.31	127.443	5.51954	274.5	.428569	-5.50288
163	-103.84	-258.31	134.94	5.00725	273.6	.315013	-4.99733
164	-103.84	-258.31	142.437	4.40293	272.8	.217299	-4.39756
165	-103.84	-258.31	149.933	3.71296	272.1	.13649	-3.71045
166	-103.84	-258.31	157.43	2.94303	271.4	.0734331	-2.94211
167	-103.84	-258.31	164.927	2.09551	270.8	.0288218	-2.09531
168	-103.84	-258.31	172.423	1.16226	270.2	3.38E-03	-1.16226
END	-103.84	-258.31	179.92	0	0	0	0
GND	-270.104	-272.947	0	2.49964	225.	-1.76903	-1.766
170	-270.104	-272.947	7.265	1.6822	207.9	-1.48728	-.786006
171	-270.104	-272.947	14.53	1.29263	185.6	-1.28655	-.125149
172	-270.104	-272.947	21.795	1.1904	157.4	-1.09879	.457959
173	-270.104	-272.947	29.06	1.34728	132.9	-.917832	.98628
174	-270.104	-272.947	36.325	1.6435	116.8	-.742293	1.46632
175	-270.104	-272.947	43.59	1.98302	106.8	-.57263	1.89854
176	-270.104	-272.947	50.855	2.31768	100.2	-.410039	2.28112
177	-270.104	-272.947	58.12	2.62393	95.6	-.256058	2.6114
178	-270.104	-272.947	65.385	2.88879	92.2	-.112355	2.8866
179	-270.104	-272.947	72.65	3.10423	89.6	.0193941	3.10417
180	-270.104	-272.947	79.915	3.26492	87.6	.137585	3.26202
181	-270.104	-272.947	87.18	3.36729	85.9	.240735	3.35867
182	-270.104	-272.947	94.445	3.40911	84.5	.327534	3.39334
183	-270.104	-272.947	101.71	3.38931	83.3	.39686	3.36599
184	-270.104	-272.947	108.975	3.3078	82.2	.447814	3.27734
185	-270.104	-272.947	116.24	3.16543	81.3	.479725	3.12887
186	-270.104	-272.947	123.505	2.96388	80.4	.492152	2.92273
187	-270.104	-272.947	130.77	2.70548	79.7	.484874	2.66167
188	-270.104	-272.947	138.035	2.3931	79.	.45786	2.34889
189	-270.104	-272.947	145.3	2.0298	78.3	.411198	1.98771
190	-270.104	-272.947	152.565	1.61821	77.7	.344945	1.58102
191	-270.104	-272.947	159.83	1.15907	77.1	.258754	1.12982
192	-270.104	-272.947	167.095	.647179	76.5	.150833	.629357
END	-270.104	-272.947	174.36	0	0	0	0

APPENDIX C

NIGHTTIME DIRECTIONAL ARRAY MODEL

IMPEDANCE – NIGHTTIME OPERATION
normalization = 50.

freq (MHz)	resist (ohms)	react (ohms)	imped (ohms)	phase (deg)	VSWR	S11 dB	S12 dB
source = 1; node 121, sector 1							
1.32	449.84	-978.69	1,077.1	294.7	51.674	-.33622	-11.279
source = 2; node 145, sector 1							
1.32	344.53	-363.32	500.7	313.5	14.63	-1.1892	-6.2062
source = 3; node 169, sector 1							
1.32	236.15	-421.63	483.26	299.3	19.941	-.8719	-7.4018

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

wire	caps	Distance	Angle	Z	radius	segs
1	none	0	0	0	.2911	24
		0	0	164.1		
2	none	167.1	175.	0	.2911	24
		167.1	175.	164.1		
3	none	334.2	175.	0	.2911	24
		334.2	175.	164.1		
4	none	501.3	175.	0	.2911	24
		501.3	175.	164.1		
5	none	324.2	45.	0	.2911	24
		324.2	45.	164.1		
6	none	251.7	75.6	0	.2911	24
		251.7	75.6	177.52		
7	none	278.4	111.9	0	.2911	24
		278.4	111.9	179.92		
8	none	384.	134.7	0	.2911	24
		384.	134.7	174.36		

Number of wires = 8
current nodes = 192

	minimum		maximum	
Individual wires	wire	value	wire	value
segment length	1	6.8375	7	7.49667
radius	1	.2911	1	.2911

ELECTRICAL DESCRIPTION – NIGHTTIME OPERATION
Frequencies (MHz)

	frequency		no. of	segment length (wavelengths)	
no.	lowest	step	steps	minimum	maximum
1	1.32	0	1	.0189931	.0208241

Sources

source	node	sector	magnitude	phase	type
1	121	1	1,432.66	83.6	voltage
2	145	1	1,667.63	356.3	voltage
3	169	1	986.023	164.2	voltage

Lumped loads

load	node	resistance (ohms)	reactance (ohms)	inductance (mH)	capacitance (uF)	passive circuit
1	1	1.E-03	0	.0275	0	0
2	25	1.E-03	0	.0275	0	0
3	49	1.E-03	0	.0275	0	0
4	73	1.E-03	0	.0275	0	0
5	97	1.E-03	0	.0275	0	0
6	121	1.E-03	0	0	0	0
7	145	1.E-03	0	0	0	0
8	169	1.E-03	0	0	0	0

RMS CURRENT – NIGHTTIME OPERATION
Frequency = 1.32 MHz
Input power = 2,800. watts
Efficiency = 100. %
coordinates in degrees

current no.	X	Y	Z	mag (amps)	phase (deg)	real (amps)	imaginary (amps)
GND	0	0	0	.740576	218.	-.583568	-.455962
2	0	0	6.8375	.602008	218.	-.474219	-.370851
3	0	0	13.675	.506745	218.1	-.39868	-.312801
4	0	0	20.5125	.4199	218.3	-.329472	-.260316
5	0	0	27.35	.338199	218.7	-.264027	-.211349
6	0	0	34.1875	.260697	219.3	-.201616	-.16527
7	0	0	41.025	.187376	220.6	-.142221	-.121996
8	0	0	47.8625	.118676	223.5	-.0861196	-.0816538
9	0	0	54.7	.0558017	232.8	-.033719	-.0444618
10	0	0	61.5375	.0180178	323.7	.0145191	-.0106694
11	0	0	68.375	.0612978	18.5	.0581214	.0194763
12	0	0	75.2125	.106912	25.3	.0966301	.0457482
13	0	0	82.05	.146352	27.7	.12962	.0679525
14	0	0	88.8875	.178729	28.7	.156713	.0859365
15	0	0	95.725	.203607	29.3	.177586	.0995941
16	0	0	102.563	.220697	29.6	.191976	.108869
17	0	0	109.4	.229813	29.7	.199685	.113753
18	0	0	116.238	.230855	29.7	.200578	.11429
19	0	0	123.075	.223798	29.6	.194577	.110568
20	0	0	129.913	.208677	29.5	.181651	.102709
21	0	0	136.75	.185555	29.3	.161787	.090859
22	0	0	143.588	.154454	29.1	.134938	.0751523
23	0	0	150.425	.115192	28.9	.100867	.0556327
24	0	0	157.263	.0669296	28.6	.058759	.032046
END	0	0	164.1	0	0	0	0
GND	-166.464	-14.5637	0	.698702	202.3	-.646278	-.265538
26	-166.464	-14.5637	6.8375	.56797	202.4	-.52527	-.216059
27	-166.464	-14.5637	13.675	.478092	202.4	-.441885	-.182509
28	-166.464	-14.5637	20.5125	.396157	202.6	-.365684	-.152366
29	-166.464	-14.5637	27.35	.319072	203.	-.293812	-.124424
30	-166.464	-14.5637	34.1875	.245947	203.6	-.225446	-.0983037
31	-166.464	-14.5637	41.025	.176756	204.7	-.160549	-.0739355
32	-166.464	-14.5637	47.8625	.111892	207.3	-.0994018	-.0513722
33	-166.464	-14.5637	54.7	.052379	215.9	-.042429	-.030714
34	-166.464	-14.5637	61.5375	.0156088	309.3	9.89E-03	-.0120766
35	-166.464	-14.5637	68.375	.0572328	4.4	.0570612	4.43E-03
36	-166.464	-14.5637	75.2125	.100375	10.7	.0986176	.0187027
37	-166.464	-14.5637	82.05	.137589	12.9	.134126	.0306712
38	-166.464	-14.5637	88.8875	.168107	13.9	.163209	.0402832
39	-166.464	-14.5637	95.725	.191539	14.4	.185551	.0475163
40	-166.464	-14.5637	102.563	.207619	14.6	.200904	.0523778

41	-166.464	-14.5637	109.4	.216179	14.7	.209091	.0549046
42	-166.464	-14.5637	116.238	.21713	14.7	.210006	.055162
43	-166.464	-14.5637	123.075	.210456	14.7	.20361	.0532416
44	-166.464	-14.5637	129.913	.196195	14.5	.189912	.0492564
45	-166.464	-14.5637	136.75	.174413	14.4	.168944	.0433335
46	-166.464	-14.5637	143.588	.145141	14.2	.140708	.0355991
47	-166.464	-14.5637	150.425	.108213	14.	.105008	.0261413
48	-166.464	-14.5637	157.263	.0628537	13.7	.0610581	.0149164
END	-166.464	-14.5637	164.1	0	0	0	0
GND	-332.928	-29.1275	0	.597263	79.3	.11102	.586854
50	-332.928	-29.1275	6.8375	.485399	79.3	.0900098	.476981
51	-332.928	-29.1275	13.675	.408239	79.4	.0750258	.401285
52	-332.928	-29.1275	20.5125	.33766	79.6	.0608561	.33213
53	-332.928	-29.1275	27.35	.271038	80.	.0470406	.266924
54	-332.928	-29.1275	34.1875	.207636	80.7	.0334787	.20492
55	-332.928	-29.1275	41.025	.147476	82.1	.0202158	.146084
56	-332.928	-29.1275	47.8625	.0909743	85.4	7.36E-03	.0906759
57	-332.928	-29.1275	54.7	.039391	97.2	-4.94E-03	.03908
58	-332.928	-29.1275	61.5375	.0184832	206.6	-.0165309	-8.27E-03
59	-332.928	-29.1275	68.375	.0577519	241.9	-.0272409	-.0509237
60	-332.928	-29.1275	75.2125	.0958506	247.4	-.0369008	-.0884628
61	-332.928	-29.1275	82.05	.128748	249.4	-.0453438	-.120498
62	-332.928	-29.1275	88.8875	.155775	250.3	-.0524101	-.146694
63	-332.928	-29.1275	95.725	.176551	250.8	-.0579493	-.16677
64	-332.928	-29.1275	102.563	.190806	251.1	-.0618232	-.180513
65	-332.928	-29.1275	109.4	.198353	251.2	-.0639069	-.187776
66	-332.928	-29.1275	116.238	.199075	251.2	-.0640895	-.188477
67	-332.928	-29.1275	123.075	.192923	251.2	-.0622728	-.182596
68	-332.928	-29.1275	129.913	.179894	251.1	-.0583682	-.170162
69	-332.928	-29.1275	136.75	.160012	250.9	-.0522884	-.151227
70	-332.928	-29.1275	143.588	.133263	250.8	-.0439289	-.125815
71	-332.928	-29.1275	150.425	.0994585	250.6	-.0331178	-.0937827
72	-332.928	-29.1275	157.263	.0578387	250.3	-.0194819	-.0544589
END	-332.928	-29.1275	164.1	0	0	0	0
GND	-499.392	-43.6912	0	.579505	317.7	.428749	-.389873
74	-499.392	-43.6912	6.8375	.470942	317.7	.348584	-.316664
75	-499.392	-43.6912	13.675	.396004	317.9	.2936	-.265741
76	-499.392	-43.6912	20.5125	.327404	318.1	.243596	-.218756
77	-499.392	-43.6912	27.35	.262601	318.5	.196664	-.174018
78	-499.392	-43.6912	34.1875	.200886	319.3	.152237	-.131068
79	-499.392	-43.6912	41.025	.142292	320.8	.110267	-.0899342
80	-499.392	-43.6912	47.8625	.0872538	324.4	.0709092	-.0508439
81	-499.392	-43.6912	54.7	.0371972	337.7	.0344129	-.0141202
82	-499.392	-43.6912	61.5375	.0199016	87.	1.06E-03	.0198735
83	-499.392	-43.6912	68.375	.0583982	119.6	-.0288718	.0507619
84	-499.392	-43.6912	75.2125	.0956495	125.2	-.0551094	.0781779
85	-499.392	-43.6912	82.05	.127871	127.3	-.0774156	.101773
86	-499.392	-43.6912	88.8875	.154386	128.3	-.09559	.121233
87	-499.392	-43.6912	95.725	.174802	128.8	-.109473	.136277
88	-499.392	-43.6912	102.563	.188841	129.	-.118952	.146668
89	-499.392	-43.6912	109.4	.196305	129.2	-.123964	.152212
90	-499.392	-43.6912	116.238	.197063	129.2	-.12449	.152761
91	-499.392	-43.6912	123.075	.191049	129.1	-.120557	.148208
92	-499.392	-43.6912	129.913	.178243	129.	-.112226	.138478
93	-499.392	-43.6912	136.75	.158647	128.9	-.0995757	.123506
94	-499.392	-43.6912	143.588	.132228	128.7	-.0826712	.103197
95	-499.392	-43.6912	150.425	.0987699	128.5	-.0614695	.077311
96	-499.392	-43.6912	157.263	.0574938	128.2	-.0355905	.0451537
END	-499.392	-43.6912	164.1	0	0	0	0
GND	229.244	-229.244	0	.456207	43.6	.330099	.314896

98	229.244	-229.244	6.8375	.370748	43.7	.268184	.255992
99	229.244	-229.244	13.675	.311772	43.7	.225275	.215528
100	229.244	-229.244	20.5125	.257797	43.9	.185838	.178671
101	229.244	-229.244	27.35	.206821	44.1	.148435	.144021
102	229.244	-229.244	34.1875	.15828	44.6	.112672	.111165
103	229.244	-229.244	41.025	.112176	45.5	.0785646	.0800692
104	229.244	-229.244	47.8625	.0687723	47.7	.0462952	.0508564
105	229.244	-229.244	54.7	.0286753	55.8	.0161218	.0237141
106	229.244	-229.244	61.5375	.0117223	185.6	-.0116664	-1.14E-03
107	229.244	-229.244	68.375	.0436428	212.6	-.0367752	-.0235006
108	229.244	-229.244	75.2125	.0730315	216.2	-.0589216	-.0431492
109	229.244	-229.244	82.05	.0982257	217.6	-.0778455	-.0599029
110	229.244	-229.244	88.8875	.118849	218.3	-.0933168	-.0736003
111	229.244	-229.244	95.725	.134647	218.7	-.105144	-.0841101
112	229.244	-229.244	102.563	.145431	218.9	-.113174	-.0913335
113	229.244	-229.244	109.4	.151073	219.1	-.117298	-.0952061
114	229.244	-229.244	116.238	.151498	219.2	-.117449	-.0956946
115	229.244	-229.244	123.075	.146683	219.2	-.113597	-.0927985
116	229.244	-229.244	129.913	.136642	219.3	-.105746	-.0865382
117	229.244	-229.244	136.75	.121412	219.3	-.093915	-.0769469
118	229.244	-229.244	143.588	.101003	219.3	-.0781043	-.064041
119	229.244	-229.244	150.425	.0752915	219.4	-.0582123	-.0477508
120	229.244	-229.244	157.263	.043729	219.4	-.0338073	-.0277362
END	229.244	-229.244	164.1	0	0	0	0
GND	62.5952	-243.792	0	.940451	148.9	-.805402	.485568
122	62.5952	-243.792	7.39667	.391914	82.5	.0514589	.388521
123	62.5952	-243.792	14.7933	.705171	27.1	.627837	.321072
124	62.5952	-243.792	22.19	1.16256	12.9	1.13317	.259741
125	62.5952	-243.792	29.5867	1.6002	7.3	1.58736	.202316
126	62.5952	-243.792	36.9833	2.00142	4.2	1.99593	.148206
127	62.5952	-243.792	44.38	2.36117	2.4	2.35916	.0974206
128	62.5952	-243.792	51.7767	2.67586	1.1	2.67539	.0501973
129	62.5952	-243.792	59.1733	2.94233	.1	2.94232	6.86E-03
130	62.5952	-243.792	66.57	3.15773	359.4	3.15757	-.0322431
131	62.5952	-243.792	73.9667	3.31967	358.8	3.319	-.0667816
132	62.5952	-243.792	81.3633	3.42633	358.4	3.42497	-.096459
133	62.5952	-243.792	88.76	3.47652	358.	3.47442	-.121029
134	62.5952	-243.792	96.1567	3.46976	357.7	3.46692	-.140304
135	62.5952	-243.792	103.553	3.40625	357.4	3.40276	-.154157
136	62.5952	-243.792	110.95	3.28695	357.2	3.28293	-.16253
137	62.5952	-243.792	118.347	3.1135	357.	3.1091	-.165429
138	62.5952	-243.792	125.743	2.88815	356.8	2.88355	-.162924
139	62.5952	-243.792	133.14	2.61374	356.6	2.60913	-.155142
140	62.5952	-243.792	140.537	2.29347	356.4	2.28905	-.142258
141	62.5952	-243.792	147.933	1.93063	356.3	1.92661	-.124471
142	62.5952	-243.792	155.33	1.52807	356.2	1.52466	-.101966
143	62.5952	-243.792	162.727	1.08683	356.1	1.08425	-.0748122
144	62.5952	-243.792	170.123	.60246	355.9	.600946	-.0426789
END	62.5952	-243.792	177.52	0	0	0	0
GND	-103.84	-258.31	0	2.35494	42.8	1.7273	1.60068
146	-103.84	-258.31	7.49667	1.75751	19.6	1.65603	.588544
147	-103.84	-258.31	14.9933	1.59729	356.4	1.5942	-.0992328
148	-103.84	-258.31	22.49	1.6823	335.1	1.52623	-.707636
149	-103.84	-258.31	29.9867	1.92158	319.	1.45105	-1.25973
150	-103.84	-258.31	37.4833	2.23092	307.8	1.36885	-1.7616
151	-103.84	-258.31	44.98	2.55682	300.1	1.2804	-2.21312
152	-103.84	-258.31	52.4767	2.86886	294.4	1.18671	-2.61191
153	-103.84	-258.31	59.9733	3.14908	290.2	1.08898	-2.9548
154	-103.84	-258.31	67.47	3.38604	287.	.988538	-3.23853
155	-103.84	-258.31	74.9667	3.57201	284.4	.886742	-3.4602

156	-103.84	-258.31	82.4633	3.70167	282.2	.784996	-3.61748
157	-103.84	-258.31	89.96	3.77142	280.5	.684685	-3.70874
158	-103.84	-258.31	97.4567	3.77908	278.9	.587176	-3.73318
159	-103.84	-258.31	104.953	3.72373	277.6	.493771	-3.69085
160	-103.84	-258.31	112.45	3.60559	276.5	.405697	-3.5827
161	-103.84	-258.31	119.947	3.42585	275.4	.32408	-3.41049
162	-103.84	-258.31	127.443	3.18665	274.5	.249931	-3.17684
163	-103.84	-258.31	134.94	2.89087	273.7	.184136	-2.885
164	-103.84	-258.31	142.437	2.54196	272.9	.127447	-2.53876
165	-103.84	-258.31	149.933	2.1436	272.2	.0804793	-2.14209
166	-103.84	-258.31	157.43	1.69909	271.5	.0437246	-1.69853
167	-103.84	-258.31	164.927	1.20979	270.8	.0175854	-1.20966
168	-103.84	-258.31	172.423	.670999	270.2	2.48E-03	-.670995
END	-103.84	-258.31	179.92	0	0	0	0
GND	-270.104	-272.947	0	1.44267	224.9	-1.02105	-1.01919
170	-270.104	-272.947	7.265	.9707	207.8	-.858276	-.453455
171	-270.104	-272.947	14.53	.745804	185.5	-.742324	-.0719557
172	-270.104	-272.947	21.795	.686901	157.3	-.633868	.264658
173	-270.104	-272.947	29.06	.777627	132.9	-.52935	.569642
174	-270.104	-272.947	36.325	.948766	116.8	-.42797	.846758
175	-270.104	-272.947	43.59	1.14485	106.8	-.329986	1.09626
176	-270.104	-272.947	50.855	1.3381	100.2	-.236095	1.3171
177	-270.104	-272.947	58.12	1.51493	95.6	-.147183	1.50776
178	-270.104	-272.947	65.385	1.66786	92.2	-.0642126	1.66662
179	-270.104	-272.947	72.65	1.79224	89.6	.0118488	1.7922
180	-270.104	-272.947	79.915	1.88501	87.6	.0800749	1.88331
181	-270.104	-272.947	87.18	1.94411	85.9	.13961	1.93909
182	-270.104	-272.947	94.445	1.96825	84.5	.189697	1.95909
183	-270.104	-272.947	101.71	1.95681	83.3	.229692	1.94329
184	-270.104	-272.947	108.975	1.90975	82.2	.259072	1.89209
185	-270.104	-272.947	116.24	1.82755	81.3	.277452	1.80636
186	-270.104	-272.947	123.505	1.71117	80.4	.28458	1.68734
187	-270.104	-272.947	130.77	1.56199	79.7	.280326	1.53663
188	-270.104	-272.947	138.035	1.38164	79.	.264674	1.35605
189	-270.104	-272.947	145.3	1.17188	78.3	.237674	1.14753
190	-270.104	-272.947	152.565	.934259	77.7	.199361	.912741
191	-270.104	-272.947	159.83	.669177	77.1	.149535	.652255
192	-270.104	-272.947	167.095	.373641	76.5	.0871618	.363332
END	-270.104	-272.947	174.36	0	0	0	0

APPENDIX D

DETUNE MODEL

ELECTRICAL DESCRIPTION – UNUSED TOWER DETUNE
Frequencies (MHz)

no.	frequency lowest	step	no. of steps	segment length (wavelengths) minimum	maximum
1	1.32	0	1	.0189931	.0189931

Plane wave source

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

Lumped loads

load	node	resistance (ohms)	reactance (ohms)	inductance (mH)	capacitance (uF)	passive circuit
1	1	1.E-03	0	.0275	0	0

GEOMETRY – UNUSED TOWER DETUNE
Wire coordinates in degrees; other dimensions in meters
Environment: perfect ground

wire	caps	Distance	Angle	Z	radius	segs
1	none	0	0	0	.2911	24
		0	0	164.1		

Number of wires = 1
current nodes = 24

Individual wires	minimum wire	minimum value	maximum wire	maximum value
segment length	1	6.8375	1	6.8375
radius	1	.2911	1	.2911

RMS CURRENTS – UNUSED TOWER DETUNE
Frequency = 1.32 MHz
Plane wave zenith (deg) = 90
Plane wave azimuth (deg) = 0
Polarization angle (deg) = 0
coordinates in degrees

current no.	X	Y	Z	mag (amps)	phase (deg)	real (amps)	imaginary (amps)
GND	0	0	0	.346528	271.3	8.16E-03	-.346432
2	0	0	6.8375	.281539	271.4	6.65E-03	-.28146
3	0	0	13.675	.236512	271.4	5.65E-03	-.236445
4	0	0	20.5125	.195136	271.4	4.77E-03	-.195078
5	0	0	27.35	.155894	271.5	3.98E-03	-.155844
6	0	0	34.1875	.118363	271.6	3.26E-03	-.118318
7	0	0	41.025	.0825469	271.8	2.6E-03	-.0825059
8	0	0	47.8625	.0486273	272.4	2.01E-03	-.0485857
9	0	0	54.7	.0168836	275.	1.49E-03	-.0168181
10	0	0	61.5375	.0125454	85.3	1.03E-03	.0125034
11	0	0	68.375	.0390815	89.1	6.32E-04	.0390764
12	0	0	75.2125	.0626072	89.7	3.01E-04	.0626065
13	0	0	82.05	.0828178	90.	3.34E-05	.0828178
14	0	0	88.8875	.0994618	90.1	-1.75E-04	.0994616

15	0	0	95.725	.112322	90.2	-3.28E-04	.112322
16	0	0	102.563	.121217	90.2	-4.28E-04	.121216
17	0	0	109.4	.126002	90.2	-4.82E-04	.126002
18	0	0	116.238	.126574	90.2	-4.95E-04	.126573
19	0	0	123.075	.122858	90.2	-4.72E-04	.122857
20	0	0	129.913	.114809	90.2	-4.22E-04	.114808
21	0	0	136.75	.10239	90.2	-3.51E-04	.102389
22	0	0	143.588	.0855363	90.2	-2.67E-04	.0855359
23	0	0	150.425	.0640614	90.2	-1.77E-04	.0640611
24	0	0	157.263	.037402	90.1	-8.76E-05	.0374019
END	0	0	164.1	0	0	0	0