Kathleen A. Kirby
202.719.3360
kkirby@wiley.law

Wiley Rein LLP
2050 M Street NW
Washington, DC 20036
Tel: 202.719.7000

wiley.law

March 27, 2023

VIA e-mail: audiofilings@fcc.gov

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

Re: **Salem Communications Holding Corporation – FRN 0003760352**
Station KXXT(AM), Tolleson, AZ (Fac. ID 54742)
Application for Station License

Dear Ms. Dortch:

On behalf of Salem Communications Holding Corporation, licensee of AM station KXXT, Tolleson, AZ, we are submitting an application on FCC Form 302-AM for license. Program Test Authority is requested.

The fee due for this application, $2,125.00, has been paid, using the FCC Fee Filer Online payment 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

Online Payment Confirmation

Total Amount	$2,125.00
Payer FRN	0003760352
Payer Name	mstoll@wileyrein.com
Remittance ID	4112341
Treasury Tracking ID	274L8PM7

Thank you for your payment!

READ INSTRUCTIONS CAREFULLY
BEFORE PROCEEDING

FEDERAL COMMUNICATIONS COMMISSION
REMITTANCE ADVICE

Approved by OMB
3060-0589

(1) LOCK BOX #	SPECIAL USE ONLY
979089	FCC USE ONLY

SECTION A – PAYER INFORMATION

(2) PAYER NAME (if paying by credit card enter name exactly as it appears on the card)	(3) TOTAL AMOUNT PAID (U.S. Dollars and cents)
Salem Communications Holding Corporation	2,125.00

(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 (include area code)	(10) COUNTRY CODE (if not in U.S.A.)
8053844502	US

FCC REGISTRATION NUMBER (FRN) REQUIRED

(11) PAYER (FRN)	(12) FCC USE ONLY
0003760352	

IF MORE THAN ONE APPLICANT, USE CONTINUATION SHEETS (FORM 159-C)
COMPLETE SECTION BELOW FOR EACH SERVICE, IF MORE BOXES ARE NEEDED, USE CONTINUATION SHEET

(13) APPLICANT NAME
Salem Communications Holding Corporation

(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 (include area code)	(20) COUNTRY CODE (if not in U.S.A.)
8053844502	US

FCC REGISTRATION NUMBER (FRN) REQUIRED

(21) APPLICANT (FRN)	(22) FCC USE ONLY
0003760352	

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

(23A) CALL SIGN/OTHER ID	(24A) PAYMENT TYPE CODE	(25A) QUANTITY
KXXT	MMR	1
(26A) FEE DUE FOR (PTC)	(27A) TOTAL FEE	FCC USE ONLY
720.00	720.00	
(28A) FCC CODE I	(29A) FCC CODE 2	
54742	Form302-AM	

(23B) CALL SIGN/OTHER ID	(24B) PAYMENT TYPE CODE	(25B) QUANTITY
KXXT	MOR	1
(26B) FEE DUE FOR (PTC)	(27B) TOTAL FEE	FCC USE ONLY
1,405.00	1,405.00	
(28B)FCC CODE I	(29B) FCC CODE 2	
54742	Form302-AM	

SECTION D – CERTIFICATION

CERTIFICATION STATEMENT

I,_____, certify under penalty of perjury that the foregoing and supporting information is true and correct to the best of my knowledge, information and belief.

SIGNATURE_____ DATE_____

SECTION E - CREDIT CARD PAYMENT INFORMATION

MASTERCARD_____ VISA_____ AMEX_____ DISCOVER_____

ACCOUNT NUMBER_____ EXPIRATION DATE _____

I hereby authorize the FCC to charge my credit card for the service(s)/authorization herein described.

SIGNATURE_____ DATE_____

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)

Salem Communications Holding Corporation

MAILING ADDRESS (Line 1) (Maximum 35 characters)

4880 Santa Rosa Road, Suite 300

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)384-4502	KXXT(AM)	54742

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	$ 720.00	

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	$ 1,405.00	

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
$ 2,125.00	

CLEAR ALL PAGES

SECTION II - APPLICANT INFORMATION		
1. NAME OF APPLICANT Salem Communications Holding Corporation		
MAILING ADDRESS 4880 Santa Rosa Road, Suite 300		
CITY Camarillo	STATE CA	ZIP CODE 93012

2. This application is for:

☑ Commercial ☐ Noncommercial

☑ AM Directional ☐ AM Non-Directional

Call letters	Community of License		Modification of Construction Permit File No(s).	Expiration Date of Last Construction Permit
KXXT(AM)	Tolleson, AZ	BP-20210528AAJ		09/28/2024

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. Program test authority is hereby requested.

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.

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	3/27/2023	(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.

CLEAR ALL PAGES

Consulting Engineers
CTJC
CARL T. JONES CORPORATION

ENGINEERING EXHIBIT
IN SUPPORT OF AN
APPLICATION FOR STATION LICENSE
STATION KXXT - TOLLESON, ARIZONA
1010 kHz – 23 kW-D, 9.8 kW-CH, 0.3 kW-N, U, DA-3
Facility ID: 54742

Applicant: Salem Communications Holding Corporation

March, 2023

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

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SECTION III OF FCC FORM 302-AM

ENGINEERING STATEMENT OF JAMES D. SADLER

FIGURE

Consulting Engineers
CTJC
CARL T. JONES CORPORATION

SECTION III - LICENSE APPLICATION ENGINEERING DATA

Name of Applicant
Salem Communications Holding Corporation

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
KXXT	BP-20210528AAJ	1010	Unlimited	0.3	23

2. Station location — Critical Hours 9.8 kW

State	City or Town
Arizona	Tolleson

3. Transmitter location			
State	County	City or Town	Street address (or other identification)
AZ	Maricopa	Phoenix	7401 Camelback Road

4. Main studio location			
State	County	City or Town	Street address (or other identification)
AZ	Maricopa	Phoenix	2425 E Camelback Road

5. Remote control point location (specify only if authorized directional antenna)			
State	County	City or Town	Street address (or other identification)
AZ	Maricopa	Phoenix	2425 E Camelback Road

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
2.55	22.0 Day 14.4 Critical Hours
Measured antenna or common point resistance (in ohms) at operating frequency Night 50.0 Day and Critical Hours 50.0	Measured antenna or common point reactance (in ohms) at operating frequency Night -j 5 Day and Critical Hours -j 5

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(NW)	0.0	141.6	1.000	1.006	----	----
2(NE)	----	0.0	----	1.000	----	----
3(S)	-76.6	----	0.286*	----	----	----

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

*Note that the current ratio on tower #3 is twice the modeled value due to the use of a TCT-3 toroidal transformer which has twice the magnitude sensitivity of the TCT-1HV toroidal transformer used on tower #1.

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, base insulated	All - 54.9	All - 55.8	#1 & #2 - 56.7 #3 - 55.8	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
33 ° 30 ' 28 "	112 ° 13 ' 01 "

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) Carl T. Jones Corporation 7901 Yarnwood Court Springfield, VA 22153	Date March 27, 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 STATEMENT OF JAMES D. SADLER
IN SUPPORT OF AN
APPLICATION FOR STATION LICENSE
STATION KXXT – TOLLESON, ARIZONA
1010 kHz – 23 kW-D, 9.8 kW-CH, 0.3 kW-N, U, DA-3
Facility ID: 54742

Applicant: Salem Communications Holding Corporation

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 Salem Communications Holding Corporation ("SCHC"), licensee of AM Radio Station KXXT, to prepare this engineering statement, Section III of FCC Form 302-AM and the associated figures and appendices in support of an Application for License. Station KXXT is licensed for operation on 1010 kilohertz with a daytime power of 15 kilowatts and a nighttime power of 0.25 kilowatts. The station is licensed to operate with a directional antenna pattern during daytime hours and non-directionally during nighttime hours. SCHC was granted a Construction Permit on September 28, 2021, FCC File No. BP-20210528AAJ, that authorizes relocation of the KXXT transmission facilities to the transmitter site of Station KPXQ, directional

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

daytime operation with a power of 23.0 kW, the addition of directional critical hours operation with a power of 9.8 kW, and directional nighttime operation with a power of 0.30 kW. The station will use the same directional antenna pattern for its daytime and critical hours operations and a different directional pattern for its nighttime operation (DA-3).

Station KPXQ is licensed for operation on 1360 kilohertz with a daytime power of 50 kilowatts and a nighttime power of 1 kilowatt. The station uses a nondirectional antenna during daytime hours and a three tower directional antenna during nighttime hours (DA-N).

After completion of the installation of the new KXXT phasing and coupling system and all diplexing filters required to minimize interaction between the two collocated stations, the KXXT directional antenna patterns were 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 KXXT 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 KXXT daytime and critical hours directional array uses the two north KPXQ towers, #1 and #2, and the KXXT nighttime directional array uses tower #1 along with the KPXQ south tower, #3. The unused towers are detuned at the KXXT operating frequency. The KPXQ towers are triangular, uniform cross-section, guyed, series fed towers. The height of each tower is 66.5 electrical degrees at the KXXT operating frequency.

The KXXT sampling system employs toroidal current transformers that are located on the tower side of the filter circuits. Tower #1 and #2 both employ TCT-1 toroidal current transformers (0.5 Volt/Ampere) while tower #3 employs a TCT-3 toroidal current transformer (1.0 Volt/Ampere). The added sensitivity in tower #3 is necessary due to the very low power of tower #3 in the nighttime directional array and results in an antenna monitor current ratio that is double the actual value. A detailed description of the impedance and sample system measurements and the computer models employed is contained below.

2.1 INDIVIDUAL TOWER IMPEDANCE MEASUREMENTS

Tower base impedance measurements were performed at the diplex filter cabinet output J-Plug located immediately adjacent to the KXXT sample system toroidal current transformers. The impedance measurements were performed by the undersigned using

a Hewlett-Packard Model 8753C network analyzer; an Amplifier Research Model 5W1000 power amplifier; and a Tunwall Radio directional coupler. The base impedance of each tower was measured with the other two KXXT towers open-circuited at the corresponding J-Plug location. The measured impedances are tabulated in Figure 2.

2.2 INDIVIDUAL TOWER COMPUTER MODELS

A Method of Moments ("MoM") computer model was developed to model each element in the array using Expert MiniNEC Broadcast Professional (Version 23.0). A wire model consisting of 15 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 and inductances were employed in a separate circuit model.[1] 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, measured shunt inductances, 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

[1] A shunt inductor is installed between the KXXT and KPXQ filters and the base of the tower on towers #1 and #2 to enhance the bandwidth performance of the stations. Each shunt inductor was adjusted for a value of 40 uH. The measured shunt inductance was included in a separate circuit model for towers #1 and #2 as indicated on Figure 2.

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 KXXT 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 KXXT daytime and nighttime directional antenna patterns. The new daytime, and critical hours and nighttime operating parameters were determined from the modeled base currents as modified by the circuit models and are tabulated in Figure 3 and in Section III of FCC Form 302-AM. The text files containing all pertinent input and output data associated with the KXXT daytime and nighttime directional antenna computer models are contained in Appendices B and C, respectively. Text files

containing all pertinent input and output data associated with the detune models for those towers that are not used in either the daytime or nighttime operating mode are contained in Appendix D.

2.4 SAMPLE SYSTEM DESCRIPTION AND VERIFICATION MEASUREMENTS

The KXXT antenna sampling system is comprised of: 1) Delta Electronics, Model TCT-1HV (tower #1), TCT-1 (tower #2), and TCT-3 (tower #3) toroidal current transformers mounted in an identical manner on the tower side of the filter circuits. The tower #1 and tower #2 transformer mounted locations are just prior to the shunt inductors and the tower #3 location corresponds to the input to the tower feed line; 2) equal lengths of RFS LCF12-50J, phase stabilized, 1/2-inch, foam dielectric, coaxial cable between each sample transformer and the transmitter building and short equal lengths of MPD-Digital, MPD-400PVS superflex jumper cables connecting the RFS LCF12-50J cable to the antenna monitor; 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*

***R₁ + j X₁** and **R₂ + j X₂** are the measured impedances at ± 45 degrees offset frequencies.*

A tabulation of the measured sample line length and the characteristic impedance of each line is contained in Figure 4. All sample line verification measurements were performed by the undersigned using a Hewlett-Packard Model 8753C network analyzer; an Amplifier Research Model 5W1000 power amplifier; and a Tunwall Radio directional coupler. As demonstrated by the measured values in Figure 4, the measured sample line lengths are well 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 current transformers connected. The measurement was performed at the KXXT operating frequency of 1010 kilohertz. 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, TCT-1 and TCT-3 toroidal current transformers was verified by driving a common reference current through each transformer and comparing the outputs as observed on the Hewlett-Packard Model 8753C network analyzer. A tabulation of the toroidal current transformer measurement data along with the serial number of each current transformer is contained in Figure 5. The measured ratio and relative phase values for each of the current transformers when compared to the reference transformer were within the manufacturers stated accuracy. The current ratio of the TCT-3 transformer relative to that of the TCT-1HV and TCT-1 transformers is double as the sensitivity of the TCT-3 current transformer is twice that of the others.

The KXXT antenna monitor is a Potomac Instruments, Model 1901-3, Serial Number 994 that was calibrated by the manufacturer on December 2, 2022, just prior to the installation and adjustment of the KXXT phasing, coupling, and filtering equipment. Filters were installed in the antenna monitor by the manufacturer to attenuate the KPXQ signal.

3.0 DAYTIME AND NIGHTTIME COMMON POINT IMPEDANCE AND CURRENT

The KXXT daytime and nighttime directional antenna systems were adjusted for the new computer derived operating parameters and for proper impedance transformation. The daytime and nighttime common point impedances were adjusted for Z = 50 -j 5.0 Ohms. The transmitter output power level was adjusted for a daytime common point current of 22.0 amperes to achieve an input power of 24,319 Watts. The transmitter output power level was adjusted for a critical hours common point current of

14.4 amperes to achieve an input power of 10,319 Watts. The transmitter output power level was adjusted for a nighttime common point current of 2.55 amperes to achieve an input power of 324 Watts.

4.0 REFERENCE FIELD STRENGTH MEASUREMENTS

Reference field strength measurements were performed on three radial bearings for the KXXT daytime and critical hours directional antenna pattern and on five different radial bearings for the KXXT nighttime directional antenna pattern. Measurements were performed on the 62° radial bearing, corresponding to the daytime and critical hours pattern main radiation lobe; and on the 189° and 295° radial bearings, corresponding to the daytime and critical hours directional pattern minima. Measurements were performed on the 157° radial bearing, corresponding to the nighttime pattern main radiation lobe; and on the 26°, 111°, 203°, and 288° radial bearings, corresponding to the nighttime directional pattern minima. Three reference field strength measurements were performed on each of the selected radial bearings.

The field strength measurements were performed by Mr. Richard White, Mr. Derik Staley, contract engineers for the licensee, and the undersigned. Mr. White and Mr. Staley are experienced in performing field strength measurements on AM directional patterns. A total of two field intensity meters were used to make the measurements. Pertinent information on each field intensity meter is contained in the following Table.

Manufacturer/Model	Serial Number	Calibration Date
Potomac Instruments/FIM-41	446	November, 2022
Potomac Instruments/FIM-41	2185	January, 2021

The performance of the field intensity meters was verified by comparing measured field strength values at several different full scale settings and verifying that the field strength values, as measured on each meter, agreed within the manufactures stated accuracy.

The measured field strength value for each established reference point location is tabulated in Figure 6, Sheets 1 through 4. The tabulations contained in Figure 6 also include for each reference location; GPS coordinates (NAD83), distance from the KXXT array center, and a description of measurement location.

5.0 CONSTRUCTION PERMIT SPECIAL CONDITIONS

The KXXT 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 two 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) both stations shall each measure antenna or

common point resistance and submit FCC Form 302 as application notifying the return to direct measurement of power.

SCHC 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 8 shows the KXXT phasing and coupling system. The schematic diagrams of Figure 9 show the diplexing filters and detuning circuits that have been installed at the base of each tower for this purpose.

KXXT and KPXQ are currently owned by SCHC, 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.

Relative field strength measurements were performed by Mr. Richard White and the undersigned which verified that all harmonic, intermodulation product and spurious emissions from the common use of the same towers are attenuated to levels that are fully compliant with the requirements of Section 73.44(b) of the FCC's Rules and Regulations. A tabulation of the measured harmonic, intermodulation product and spurious emissions is contained in Figure 7. In no case does the measured emission level exceed the corresponding FCC emission limit.

Finally, after all installation and modifications were completed, the KPXQ base impedances were measured at the filter output J-plug location with all other towers open circuited at the corresponding location. Method of Moments computer modeling was performed to develop a revised set of KPXQ nighttime operating parameters. With the KPXQ nighttime directional antenna system adjusted for the new computer derived operating parameters, the ATU networks were adjusted for proper impedance matches

and the common point network was adjusted for a resistance of 50 Ohms and the authorized nighttime input power level. The daytime non-directional network was adjusted for proper impedance match and the transmitter output power was adjusted for the authorized daytime power as determined at the output of the antenna matching network. It is planned to file FCC Form 302-AM requesting modified operating parameters and requesting a return to direct measurement of power.

6.0 SUMMARY

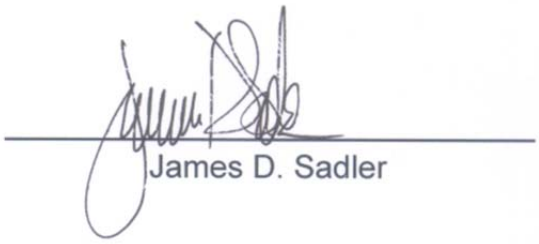
It is submitted that the KXXT daytime and nighttime directional antenna systems have been properly adjusted to comply with the technical specifications contained in Construction Permit, FCC File No. BP-20210528AAJ. The daytime and nighttime directional pattern performance has been verified using computer 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 KPXQ Applications for Direct Measurement of Power, it is submitted that SCHC has satisfied all of the special conditions contained in the construction permit regarding the common usage of the antennas at the transmitter site by both stations. It is requested that program test authority be issued at the full authorized daytime, critical hours and nighttime power levels and that a license be issued to SCHC 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: March 27, 2023



TOWER MODEL HEIGHT AND RADIUS

STATION KXXT - TOLLESON, ARIZONA
1010 kHz - 23 kW-D, 9.8 kW-CH, 0.3 kW-N, U, DA-3
MARCH, 2023

Tower	Physical Height (degrees)	Modeled Height (degrees)	Percent of Physical Height	Tower Face Width (meters)	Equivalent Radius (meters)	Modeled Radius (meters)	Percent of Equivalent Radius
1	66.50	69.80	105.0	0.4064	0.1940	0.1940	100.0
2	66.50	69.80	105.0	0.4064	0.1940	0.1940	100.0
3	66.50	73.80	111.0	0.4064	0.1940	0.1940	100.0

MEASURED AND MODELED IMPEDANCES

STATION KXXT - TOLLESON, ARIZONA
1010 kHz - 23 kW-D, 9.8 kW-CH, 0.3 kW-N, U, DA-3
MARCH, 2023

Tower	Measured Tower Base Impedance[1]	Modeled Tower Base Impedance	Shunt Capacitance (pF)	Shunt Inductance (uH)	Modeled plus Shunt Reactance	Lumped Series Inductance (uH)	Total Adjusted Tower Base Impedance
1	39.8 -j 65.8	19.6 -j 89.0	89.0	40.0	39.7 -j 123.5	9.10	39.7 -j 65.7
2	49.1 -j 78.8	19.6 -j 89.3	0.0	40.0	45.9 -j 132.2	8.40	45.9 -j 78.8
3	22.1 -j 46.3	22.6 -j 69.0	15.0	0.0	22.3 -j 68.6	3.50	22.3 -j 46.3

[1] Measured at output of Filter network adjacent to the sample toroid with the other towers open circuited at the same relative location.

Figure 2

ANTENNA MONITOR PARAMETERS AND COMMON POINT DATA

STATION KXXT - TOLLESON, ARIZONA
1010 kHz - 23 kW-D, 9.8 kW-CH, 0.3 kW-N, U, DA-3
MARCH, 2023

DAYTIME AND CRITICAL HOURS		
Tower	**Ratio**	**Phase (deg)**
1	1.106	141.6
2	1.000	0.0
Common Point Impedance = 50 -j 5 ohms Common Point Current = 22.0 amperes Daytime; 14.4 amperes Critical Hours Antenna Input Power = 24,219 Watts Daytime; 10,319 Watts Critical Hours		

NIGHTTIME		
Tower	**Ratio**	**Phase (degrees)**
1	1.000	0.0
3	0.286[1]	-76.6
Common Point Impedance = 50 -j 5 ohms Common Point Current = 2.55 amperes Antenna Input Power = 324 Watts		

[1] Note that the current ratio on tower #3 is twice the modeled value due to the use of a TCT-3 toroidal transformer which has twice the magnitude sensitivity of the TCT-1HV toroidal transformer used on tower #1.

SAMPLE LINE VERIFICATION MEASUREMENTS

STATION KXXT - TOLLESON, ARIZONA
1010 kHz - 23 kW-D, 9.8 kW-CH, 0.3 kW-N, U, DA-3
MARCH, 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 Sample Toroid Connected[2] (Ohms)
1	1102.2	247.4	918.5	4.62 -j 50.30	1285.9	6.45 +j 49.14	50.03	52.44 -j 0.80
2	1102.5	247.3	918.8	4.64 -j 50.22	1286.3	6.45 +j 49.18	50.02	51.94 -j 0.50
3	1102.6	247.3	918.8	4.69 -j 50.22	1286.4	6.54 +j 49.32	50.09	52.88 -j 1.52

[1] At this frequency, the sample line electrical length is equal to 270°.

[2] At carrier frequency (1010 kHz)

Figure 4

SAMPLE DEVICE CALIBRATION

STATION KXXT - TOLLESON, ARIZONA
1010 kHz - 23 kW-D, 9.8 kW-CH, 0.3 kW-N, U, DA-3
MARCH, 2023

Reference Sample Toroid Number	Measured Sample Toroid Number	Measured	
		Field Ratio	Phase (degrees)
1	2	1.003	-0.3
1	3	2.006*	0.4
2	3	1.996*	0.5

Sample Toroid Number	Type	Serial Number
1	Delta Electronics, TCT-1HV	1461
2	Delta Electronics, TCT-1	5867
3	Delta Electronics, TCT-3	17724

* Note that the tower #3 toroidal current transformer is a TCT-3 with double the the relative sensitivity and magnitude of the TCT-1 toroidal current transformers.

REFERENCE FIELD STRENGTH MEASUREMENTS

STATION KXXT - TOLLESON, ARIZONA
1010 kHz - 23 kW-D, 9.8 kW-CH, 0.3 kW-N, U, DA-3
MARCH, 2023

26 Degree Radial

Point Number	Distance (km)	Daytime Field (mV/m)	Nighttime Field (mV/m)	Geographic Coordinates (NAD83)		Description
				Latitude	Longitude	
1	1.47	- - -	74	33° 31' 10.8"	112° 12' 38.6"	Point is located on the sidewalk near mailbox #6979 W Montebello Avenue, Glendale, AZ.
2	3.33	- - -	35	33° 32' 04.8"	112° 12' 06.6"	Point is located on the sidewalk in line with fire hydrant on the South side of W Ocotillo Road, building #6825, Glendale, AZ.
3	5.86	- - -	21	33° 33' 18.5"	112° 11' 23.8"	Point is located on the sidewalk near mailbox #6036 W Harmont Drive, Glendale, AZ.

62 Degree Radial

Point Number	Distance (km)	Daytime Field (mV/m)	Critical Hours Field (mV/m)	Geographic Coordinates (NAD83)		Description
				Latitude	Longitude	
1	5.38	370	225	33° 31' 49.9"	112° 09' 59.3"	Point is located on the sidewalk in line with front door of #495 W Stella Avenue, Glendale, AZ.
2	6.81	286	165	33° 32' 11.6"	112° 09' 10.0"	Point is located on the sidewalk in front of gate at the end of the parking lot on the South side of W Lamar Road and East of #4333,
3	8.30	249	159	33° 32' 34.5"	112° 08' 19.0"	Point is located on the sidewalk at the Northwest corner of N 37th Avenue and N 37th Avenue cul-de-sac, #7224, Phoenix, AZ.

REFERENCE FIELD STRENGTH MEASUREMENTS

STATION KXXT - TOLLESON, ARIZONA
1010 kHz - 23 kW-D, 9.8 kW-CH, 0.3 kW-N, U, DA-3
MARCH, 2023

111 Degree Radial

Point Number	Distance (km)	Daytime Field (mV/m)	Nighttime Field (mV/m)	Geographic Coordinates (NAD83)		Description
				Latitude	Longitude	
1	2.13	- - -	59	33° 29' 48.4"	112° 10' 59.0"	Point is located on the sidewalk near fire hydrant between #5722 and #5716 W Monterosa Street, Phoenix, AZ.
2	3.79	- - -	37	33° 29' 44.2"	112° 10' 46.3"	Point is located on the sidewalk in line with front door of #4111 N 56th Avenue, Phoenix, AZ.
3	5.44	- - -	31	33° 29' 24.8"	112° 09' 46.3"	Point is located on the sidewalk near the fire hydrant on the South corner of N 48th Avenue and W Mitchell Drive, Phoenix, AZ.

157 Degree Radial

Point Number	Distance (km)	Daytime Field (mV/m)	Nighttime Field (mV/m)	Geographic Coordinates (NAD83)		Description
				Latitude	Longitude	
1	2.93	- - -	56.00	33° 29' 00.9"	112° 12' 19.3"	Point is located in the center of the cul-de-sac on W Earll Drive, #6750, Phoenix, AZ.
2	3.59	- - -	41.00	33° 28' 41.2"	112° 12' 09.2	Point is located on the North side of street across form #6639 W Winsor Avenue, Phoenix, AZ.
3	4.88	- - -	34	33° 28' 02.7"	112° 11' 49.7"	Point is located near fire hydrant across form #1640 N 64th Avenue, Phoenix, AZ.

REFERENCE FIELD STRENGTH MEASUREMENTS

STATION KXXT - TOLLESON, ARIZONA
1010 kHz - 23 kW-D, 9.8 kW-CH, 0.3 kW-N, U, DA-3
MARCH, 2023

189 Degree Radial

Point Number	Distance (km)	Daytime Field (mV/m)	Critical Hours Field (mV/m)	Geographic Coordinates (NAD83)		Description
				Latitude	Longitude	
1	2.86	30.5	20	33° 28' 56.7"	112° 13' 20.9"	Point is located at the mailbox for #7601 W Pinchot Avenue, Phoenix, AZ.
2	4.34	16.0	10	33° 28' 09.3"	112° 13' 29.9"	Point is located on the northwest corner of W Palm Lane and N 77th Drive, #7714 W Palm Lane, Phoenix, AZ.
3	4.70	19.0	9.5	33° 29' 57.7"	112° 13' 32.0"	Point is located on the sidewalk between #7733 and #7729 W Giles Road, Phoenix, AZ.

203 Degree Radial

Point Number	Distance (km)	Daytime Field (mV/m)	Nighttime Field (mV/m)	Geographic Coordinates (NAD83)		Description
				Latitude	Longitude	
1	2.31	- - -	72	33° 29' 19.3"	112° 13' 38.5"	Point is located at the end of the driveway for #7806 W Mitchel Drive, Phoenix, AZ.
2	3.81	- - -	45	33° 28' 34.5"	112° 14' 01.3"	Point is located on West Virginia Avenue East of 83rd Avenue, halfway between dead end and last gated entrance to apartment, Phoenix, AZ.
3	5.26	- - -	32	33° 27' 51.3"	112° 14' 23.3"	Point is located at the East corner of East entrance of Premier Inn, #8399 W Lynwood Street, Phoenix, AZ.

REFERENCE FIELD STRENGTH MEASUREMENTS

STATION KXXT - TOLLESON, ARIZONA
1010 kHz - 23 kW-D, 9.8 kW-CH, 0.3 kW-N, U, DA-3
MARCH, 2023

288 Degree Radial

Point Number	Distance (km)	Daytime Field (mV/m)	Nighttime Field (mV/m)	Geographic Coordinates (NAD83)		Description
				Latitude	Longitude	
1	1.99	- - -	70	33° 30' 48.2"	112° 14' 17.2"	Point is located North side of street in line with front door to #8310 W Oregon Avenue, Phoenix, AZ.
2	2.46	- - -	56	33° 30' 52.7"	112° 14' 34.3"	Point is located on the Northwest corner of N 85th Avenue and Georgia Avenue, #8520 Georgia Avenue, Glendale, AZ.
3	3.58	- - -	42	33° 31' 04.0"	112° 15' 15.6"	Point is located on the Southwest corner of Luke Avenue and N 90th Drive, Glendale, AZ.

295 Degree Radial

Point Number	Distance (km)	Daytime Field (mV/m)	Critical Hours Field (mV/m)	Geographic Coordinates (NAD83)		Description
				Latitude	Longitude	
1	2.15	38.00	24	33° 30' 57.5"	112° 14' 19.2"	Point is located on the sidewalk at the Southeast corner of W Missouri Avenue and N 83rd Drive, #8357 N 83rd Drive, Glendale, AZ.
2	2.96	37.00	23	33° 31' 08.7"	112° 14' 47.7"	Point is located on the sidewalk at the center of driveway for #5709 N 87th Drive, Glendale, AZ.
3	3.65	41.00	25	33° 31' 18.1"	112° 15' 12.2"	Point is located on the sidewalk in line with the front door for #5920 N 90th Drive, Glendale, AZ.

MEASURED SPURIOUS AND HARMONIC EMISSIONS
DAYTIME OPERATION
STATION KXXT - TOLLESON, ARIZONA
1010 kHz - 23 kW-D, 9.8 kW-CH, 0.3 kW-N, U, DA-3
MARCH, 2023

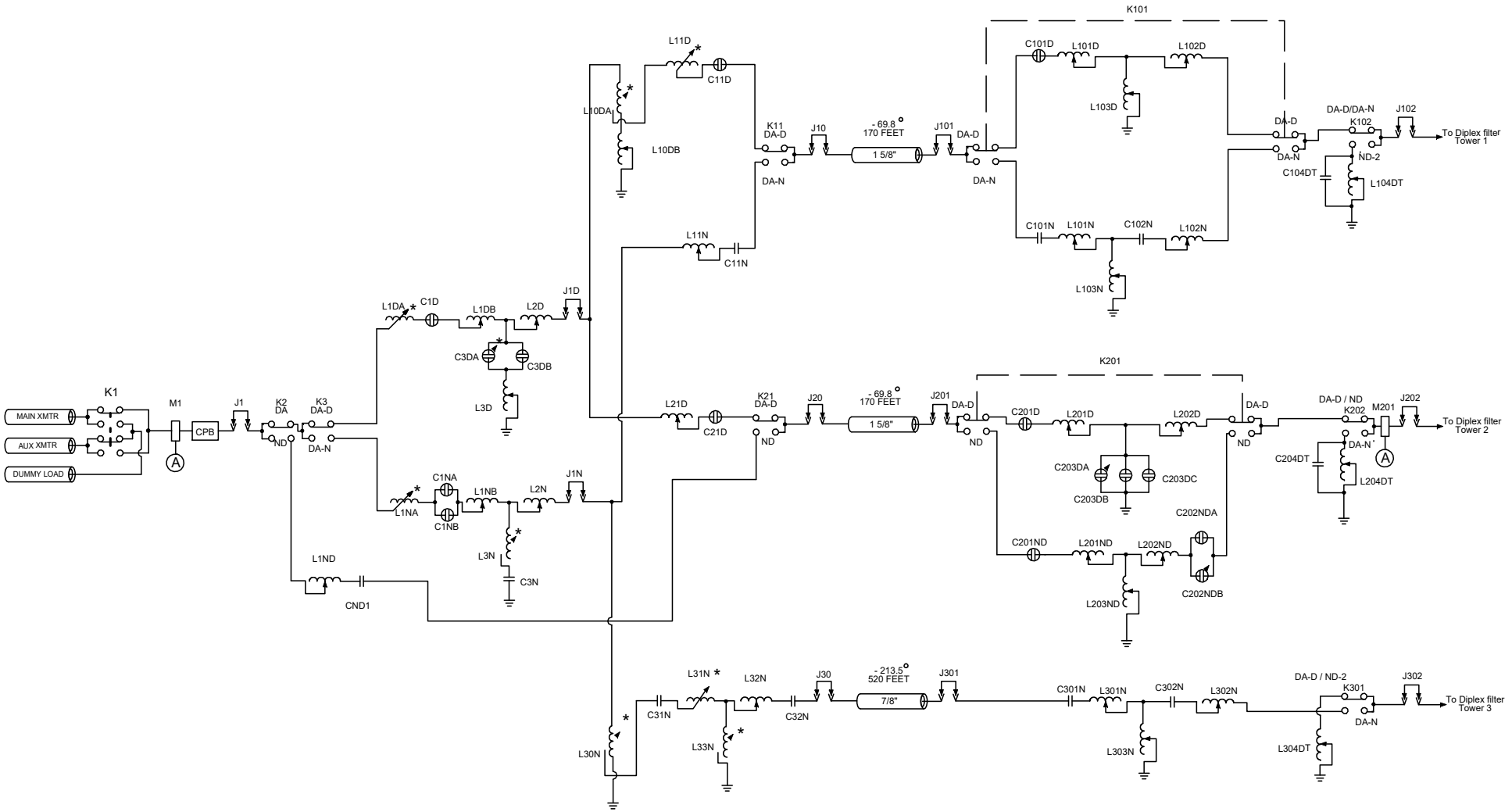
Measured Attenuation - Daytime

Emission	Frequency (kHz)	Field Strength (mV/m)	Reference Carrier	Below Carrier (dBc)	FCC Limit (dBc)
F1	1010	830	- - - -	- - - -	- - - -
F2	1360	760	- - - -	- - - -	- - - -
2F1-F2	660	0.070	F1	-81.5	-80
2F2-F1	1710	0.040[1]	F2	-85.6	-80
2F1	2020	0.030	F1	-88.8	-80
F1+F2	2370	0.042	F1 or F2	-85.2	-80
2F2	2720	0.044	F2	-84.7	-80
3F1	3030	0.015	F1	-94.9	-80
2F1+F2	3380	0.030	F1	-88.8	-80
F1+2F2	3730	0.050	F2	-83.6	-80
3F2	4080	0.065	F2	-81.4	-80

Measured Attenuation - Nighttime

Emission	Frequency (kHz)	Field Strength (mV/m)	Reference Carrier	Below Carrier (dBc)	FCC Limit (dBc)
F1	1010	730	- - - -	- - - -	- - - -
F2	1360	2750	- - - -	- - - -	- - - -
2F1-F2	660	0.060	F1	-82.8	-67.8
2F2-F1	1710	0.021	F2	-91.2	-73
2F1	2020	0.016	F1	-94.3	-67.8
F1+F2	2370	0.080	F1 or F2	-79.6	-73
2F2	2720	0.095	F2	-78.1	-73
3F1	3030	0.015	F1	-94.9	-67.8
2F1+F2	3380	0.041	F1	-86.1	-67.8
F1+2F2	3730	0.085	F2	-79.0	-73
3F2	4080	0.050	F2	-83.6	-73

[1] Unknown intermittent source approximately 90° to station increases the measured value on this frequency.



PHASING AND COUPLING SYSTEM SCHEMATIC DIAGRAM

STATION KXXT - TOLLESON, ARIZONA

1010 kHz - 23 kW-D, 9.8 kW-CH, 0.3 kW-N, U, DA-3

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Figure 8

*DENOTES FRONT PANEL CONTROL

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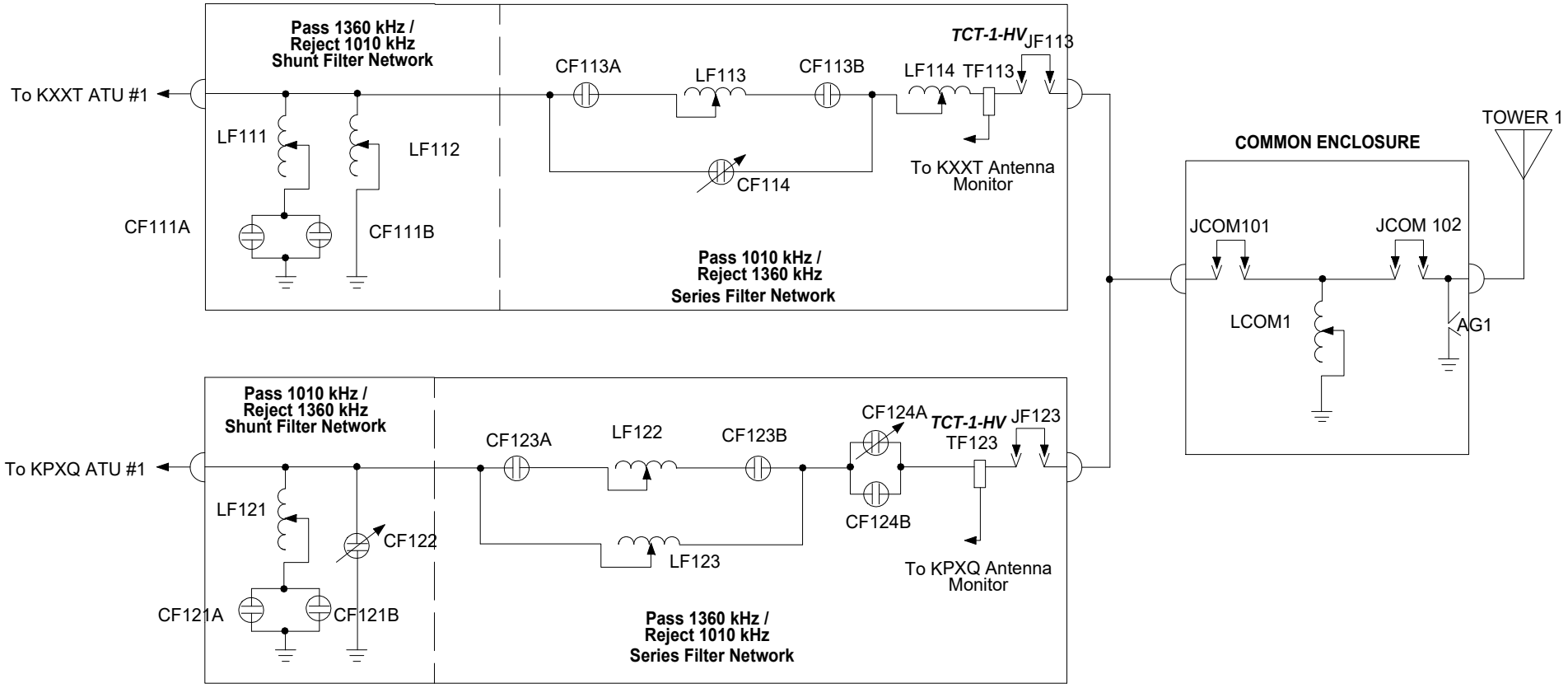

DIPLEX FILTER CIRCUIT SCHEMATIC DIAGRAM
TOWER #1 (NORTHWEST)

STATION KXXT - TOLLESON, ARIZONA
1010 kHz - 23 kW-D, 9.8 kW-CH, 0.3 kW-N, U, DA-3
MARCH, 2023

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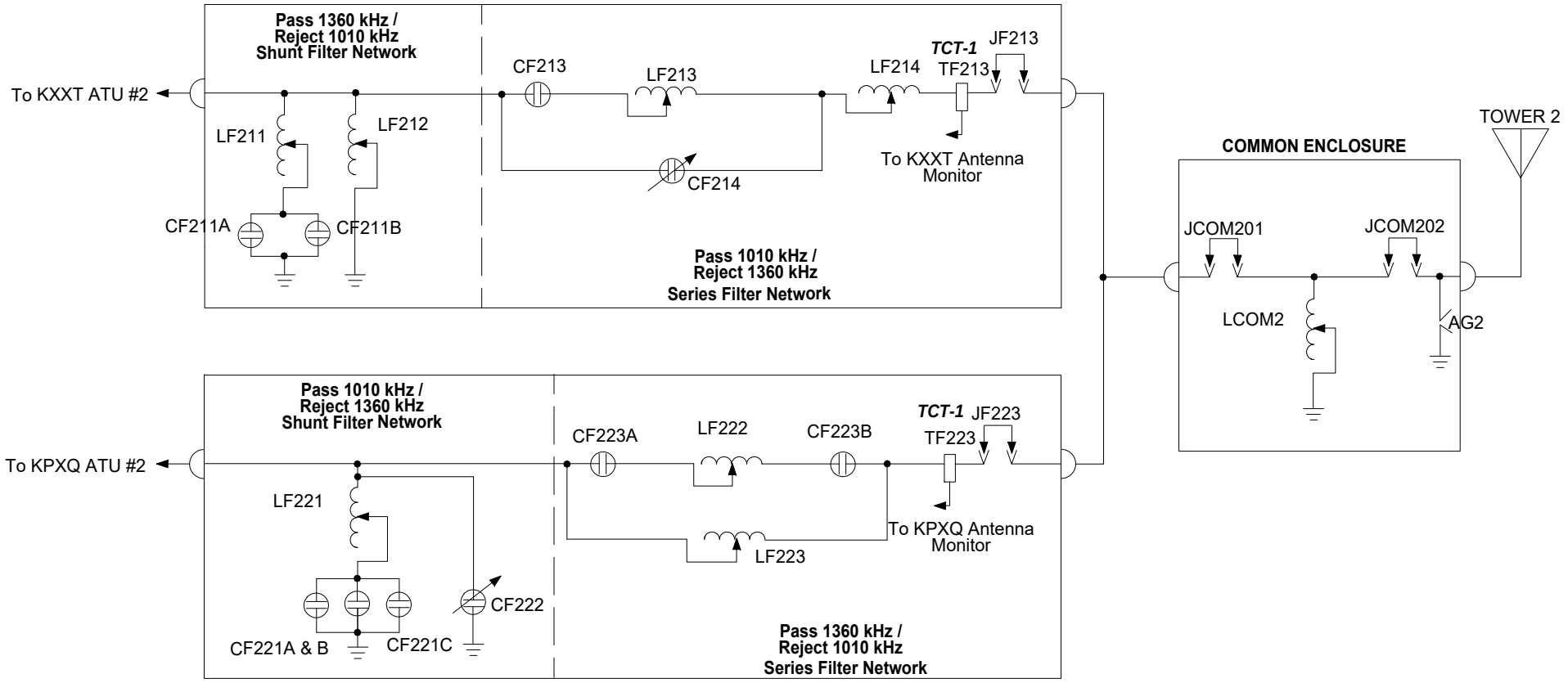
Figure 9
Sheet 1 of 3



DIPLEX FILTER CIRCUIT SCHEMATIC DIAGRAM
TOWER #2 (NORTHEAST)

STATION KXXT - TOLLESON, ARIZONA
1010 kHz - 23 kW-D, 9.8 kW-CH, 0.3 kW-N, U, DA-3
MARCH, 2023

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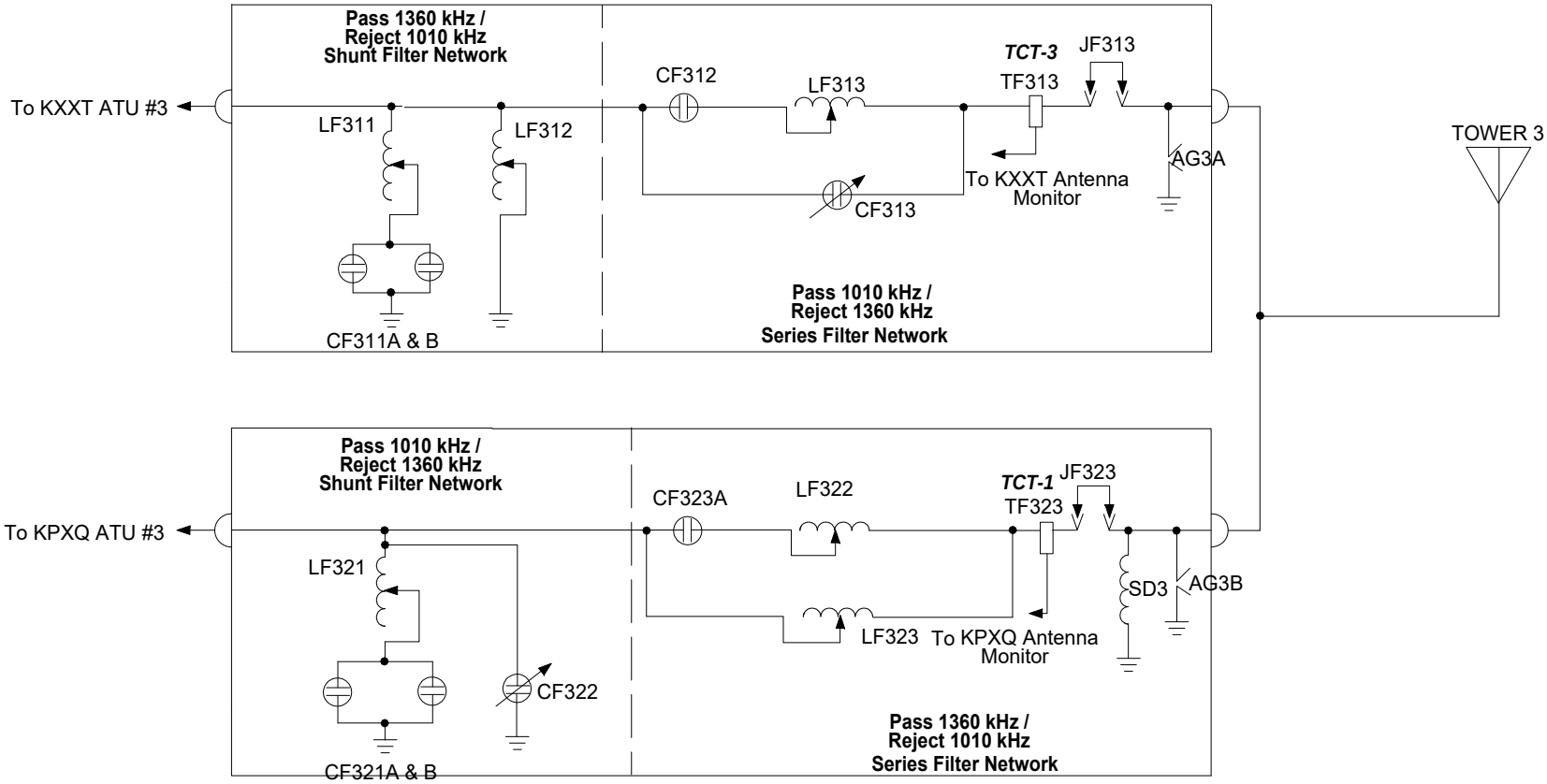
Figure 9
Sheet 2 of 3



DIPLEX FILTER CIRCUIT SCHEMATIC DIAGRAM
TOWER #3 (SOUTH)

STATION KXXT - TOLLESON, ARIZONA
1010 kHz - 23 kW-D, 9.8 kW-CH, 0.3 kW-N, U, DA-3
MARCH, 2023

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Figure 9
Sheet 3 of 3

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 1, sector 1							
1.01	19.623	-89.043	91.179	282.4	10.93	-1.5939	-5.1259

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	.194	15
		0	0	69.83		
2	none	66.5	62.	0	.194	15
		66.5	62.	69.83		
3	none	133.1	157.	0	.194	15
		133.1	157.	73.82		

Number of wires = 3
current nodes = 45

Individual wires	minimum wire	minimum value	maximum wire	maximum value
segment length	1	4.65533	3	4.92133
radius	1	.194	1	.194

ELECTRICAL DESCRIPTION – TOWER #1
Frequencies (MHz)

no.	frequency lowest	step	no. of steps	segment length (wavelengths) minimum	maximum
1	1.01	0	1	.0129315	.0136704

Sources

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

Lumped loads

load	node	resistance (ohms)	reactance (ohms)	inductance (mH)	capacitance (uF)	passive circuit
1	1	.01	0	0	0	0
2	16	.01	253.84	0	0	0
3	31	.01	-10,505.3	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 16, sector 1							
1.01	19.578	-89.276	91.397	282.4	10.996	-1.5841	-5.1479

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	.194	15
		0	0	69.83		
2	none	66.5	62.	0	.194	15
		66.5	62.	69.83		
3	none	133.1	157.	0	.194	15
		133.1	157.	73.82		

Number of wires = 3
current nodes = 45

Individual wires	minimum wire	minimum value	maximum wire	maximum value
segment length	1	4.65533	3	4.92133
radius	1	.194	1	.194

ELECTRICAL DESCRIPTION – TOWER #2
Frequencies (MHz)

no.	frequency lowest	step	no. of steps	segment length (wavelengths) minimum	maximum
1	1.01	0	1	.0129315	.0136704

Sources

source	node	sector	magnitude	phase	type
1	16	1	1.	0	voltage

Lumped loads

load	node	resistance (ohms)	reactance (ohms)	inductance (mH)	capacitance (uF)	passive circuit
1	1	.01	296.32	0	0	0
2	16	.01	0	0	0	0
3	31	.01	-10,505.3	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 31, sector 1							
1.01	22.592	-69.036	72.639	288.1	6.7356	-2.5983	-3.4655

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	.194	15
		0	0	69.83		
2	none	66.5	62.	0	.194	15
		66.5	62.	69.83		
3	none	133.1	157.	0	.194	15
		133.1	157.	73.82		

Number of wires = 3
current nodes = 45

	minimum		maximum	
Individual wires	wire	value	wire	value
segment length	1	4.65533	3	4.92133
radius	1	.194	1	.194

ELECTRICAL DESCRIPTION – TOWER #3
Frequencies (MHz)

no.	frequency lowest	step	no. of steps	segment length (wavelengths) minimum	maximum
1	1.01	0	1	.0129315	.0136704

Sources

source	node	sector	magnitude	phase	type
1	31	1	1.	0	voltage

Lumped loads

load	node	resistance (ohms)	reactance (ohms)	inductance (mH)	capacitance (uF)	passive circuit
1	1	.01	296.32	0	0	0
2	16	.01	253.84	0	0	0
3	31	.01	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 1, sector 1							
1.01	5.8574	-93.724	93.907	273.6	38.621	-.4499	-10.07
source = 2; node 16, sector 1							
1.01	11.541	-74.237	75.128	278.8	14.042	-1.2392	-6.0513

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	.194	15
		0	0	69.83		
2	none	66.5	62.	0	.194	15
		66.5	62.	69.83		
3	none	133.1	157.	0	.194	15
		133.1	157.	73.82		

Number of wires = 3
current nodes = 45

	minimum		maximum	
Individual wires	wire	value	wire	value
segment length	1	4.65533	3	4.92133
radius	1	.194	1	.194

ELECTRICAL DESCRIPTION – DAYTIME OPERATION
Frequencies (MHz)

	frequency		no. of	segment length (wavelengths)	
no.	lowest	step	steps	minimum	maximum
1	1.01	0	1	.0129315	.0136704

Sources

source	node	sector	magnitude	phase	type
1	1	1	5,263.95	274.2	voltage
2	16	1	3,673.66	139.8	voltage

Lumped loads

load	node	resistance (ohms)	reactance (ohms)	inductance (mH)	capacitance (uF)	passive circuit
1	1	.01	0	0	0	0
2	16	.01	0	0	0	0
3	31	.01	0	.104	0	0

RMS CURRENT – DAYTIME OPERATION
Frequency = 1.01 MHz
Input power = 23,000. watts
Efficiency = 99.88 %
coordinates in degrees

current no.	X	Y	Z	mag (amps)	phase (deg)	real (amps)	imaginary (amps)
GND	0	0	0	39.6367	.6	39.6344	.429883
2	0	0	4.65533	37.6798	.5	37.6786	.297114
3	0	0	9.31067	36.0389	.3	36.0383	.208576
4	0	0	13.966	34.2923	.2	34.292	.133386
5	0	0	18.6213	32.3906	.1	32.3905	.067934
6	0	0	23.2767	30.3183	0.0	30.3183	.0110603
7	0	0	27.932	28.0725	359.9	28.0725	-.0374523
8	0	0	32.5873	25.6562	359.8	25.6561	-.0773934
9	0	0	37.2427	23.0755	359.7	23.0753	-.108324
10	0	0	41.898	20.3373	359.6	20.3369	-.129669
11	0	0	46.5533	17.4486	359.5	17.448	-.140768
12	0	0	51.2087	14.4137	359.4	14.413	-.14088
13	0	0	55.864	11.2309	359.3	11.2302	-.129154
14	0	0	60.5193	7.88343	359.2	7.88274	-.104464
15	0	0	65.1747	4.31221	359.1	4.31172	-.0648991
END	0	0	69.83	0	0	0	0
GND	31.2199	-58.716	0	34.5764	221.	-26.1111	-22.6658
17	31.2199	-58.716	4.65533	33.1909	220.6	-25.1884	-21.6143
18	31.2199	-58.716	9.31067	31.9568	220.4	-24.3305	-20.7187
19	31.2199	-58.716	13.966	30.5831	220.2	-23.3476	-19.7538
20	31.2199	-58.716	18.6213	29.0365	220.1	-22.2189	-18.6933
21	31.2199	-58.716	23.2767	27.3075	219.9	-20.939	-17.5289
22	31.2199	-58.716	27.932	25.3959	219.8	-19.5088	-16.259
23	31.2199	-58.716	32.5873	23.3055	219.7	-17.9323	-14.8855
24	31.2199	-58.716	37.2427	21.0423	219.6	-16.2147	-13.4113
25	31.2199	-58.716	41.898	18.6135	219.5	-14.362	-11.8403
26	31.2199	-58.716	46.5533	16.0255	219.4	-12.3799	-10.1762
27	31.2199	-58.716	51.2087	13.2825	219.3	-10.272	-8.42085
28	31.2199	-58.716	55.864	10.3829	219.3	-8.03753	-6.57292
29	31.2199	-58.716	60.5193	7.31103	219.2	-5.66467	-4.62198
30	31.2199	-58.716	65.1747	4.01146	219.2	-3.11075	-2.5328
END	31.2199	-58.716	69.83	0	0	0	0
GND	-122.519	-52.0063	0	.299806	328.3	.255003	-.157661
32	-122.519	-52.0063	4.92133	.200728	328.3	.170756	-.105519
33	-122.519	-52.0063	9.84267	.136373	328.3	.116088	-.0715619
34	-122.519	-52.0063	14.764	.0838419	328.5	.0715195	-.0437542
35	-122.519	-52.0063	19.6853	.0401793	329.2	.0345255	-.0205516
36	-122.519	-52.0063	24.6067	4.28E-03	341.9	4.07E-03	-1.33E-03
37	-122.519	-52.0063	29.528	.0248352	145.1	-.0203746	.0142008
38	-122.519	-52.0063	34.4493	.0470928	146.2	-.0391224	.0262139
39	-122.519	-52.0063	39.3707	.0629154	146.4	-.0524054	.0348141
40	-122.519	-52.0063	44.292	.0724988	146.4	-.0604129	.0400795
41	-122.519	-52.0063	49.2133	.076015	146.4	-.063312	.0420698
42	-122.519	-52.0063	54.1347	.0736075	146.3	-.0612471	.0408272
43	-122.519	-52.0063	59.056	.0653667	146.2	-.0543198	.0363617
44	-122.519	-52.0063	63.9773	.0512526	146.1	-.0425255	.0286079
45	-122.519	-52.0063	68.8987	.0308571	145.9	-.0255578	.0172906
END	-122.519	-52.0063	73.82	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 1, sector 1							
1.01	17.91	-90.27	92.029	281.2	12.167	-1.431	-5.5174
source = 2; node 31, sector 1							
1.01	136.44	-52.561	146.21	338.9	3.1863	-5.6423	-1.3832

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	.194	15
		0	0	69.83		
2	none	66.5	62.	0	.194	15
		66.5	62.	69.83		
3	none	133.1	157.	0	.194	15
		133.1	157.	73.82		

Number of wires = 3
current nodes = 45

Individual wires	minimum wire	minimum value	maximum wire	maximum value
segment length	1	4.65533	3	4.92133
radius	1	.194	1	.194

ELECTRICAL DESCRIPTION – NIGHTTIME OPERATION
Frequencies (MHz)

no.	frequency lowest	step	no. of steps	segment length (wavelengths) minimum	maximum
1	1.01	0	1	.0129315	.0136704

Sources

source	node	sector	magnitude	phase	type
1	1	1	513.69	282.9	voltage
2	31	1	81.1134	258.3	voltage

Lumped loads

load	node	resistance (ohms)	reactance (ohms)	inductance (mH)	capacitance (uF)	passive circuit
1	1	.01	0	0	0	0
2	16	.01	0	.109	0	0
3	31	.01	0	0	0	0

RMS CURRENT – NIGHTTIME OPERATION
Frequency = 1.01 MHz
Input power = 300. watts
Efficiency = 99.95 %
coordinates in degrees

current no.	X	Y	Z	mag (amps)	phase (deg)	real (amps)	imaginary (amps)
GND	0	0	0	3.94694	1.7	3.94527	.114858
2	0	0	4.65533	3.75882	1.2	3.75806	.0756795
3	0	0	9.31067	3.59998	.8	3.59962	.0503399
4	0	0	13.966	3.42988	.5	3.42975	.0295911
5	0	0	18.6213	3.24376	.2	3.24374	.012266
6	0	0	23.2767	3.04008	360.	3.04008	-2.1E-03
7	0	0	27.932	2.81851	359.7	2.81848	-.0137336
8	0	0	32.5873	2.57931	359.5	2.57921	-.0227364
9	0	0	37.2427	2.32298	359.3	2.3228	-.0291739
10	0	0	41.898	2.05017	359.1	2.0499	-.0330811
11	0	0	46.5533	1.76146	358.9	1.76113	-.0344751
12	0	0	51.2087	1.45721	358.7	1.45683	-.0333553
13	0	0	55.864	1.13714	358.5	1.13675	-.0296922
14	0	0	60.5193	.799436	358.3	.799094	-.0233917
15	0	0	65.1747	.437986	358.1	.437756	-.0141853
END	0	0	69.83	0	0	0	0
GND	31.2199	-58.716	0	.0939436	66.7	.0371333	.0862931
17	31.2199	-58.716	4.65533	.0625682	66.6	.0248663	.0574147
18	31.2199	-58.716	9.31067	.0424177	65.9	.0172969	.0387309
19	31.2199	-58.716	13.966	.0260774	63.9	.0114602	.0234242
20	31.2199	-58.716	18.6213	.0126947	56.9	6.94E-03	.0106328
21	31.2199	-58.716	23.2767	3.51E-03	.2	3.51E-03	9.8E-06
22	31.2199	-58.716	27.932	8.67E-03	276.7	1.02E-03	-8.61E-03
23	31.2199	-58.716	32.5873	.0153162	267.5	-6.65E-04	-.0153017
24	31.2199	-58.716	37.2427	.0201927	265.3	-1.67E-03	-.0201239
25	31.2199	-58.716	41.898	.0231984	264.8	-2.11E-03	-.0231019
26	31.2199	-58.716	46.5533	.0243451	265.	-2.13E-03	-.0242514
27	31.2199	-58.716	51.2087	.0236477	265.5	-1.85E-03	-.0235749
28	31.2199	-58.716	55.864	.0211004	266.2	-1.39E-03	-.0210544
29	31.2199	-58.716	60.5193	.016648	267.	-8.62E-04	-.0166256
30	31.2199	-58.716	65.1747	.0101064	267.9	-3.7E-04	-.0100997
END	31.2199	-58.716	69.83	0	0	0	0
GND	-122.519	-52.0063	0	.392279	279.4	.0638377	-.38705
32	-122.519	-52.0063	4.92133	.381153	275.4	.0357885	-.379469
33	-122.519	-52.0063	9.84267	.370856	272.7	.0177382	-.370432
34	-122.519	-52.0063	14.764	.358639	270.5	3.19E-03	-.358625
35	-122.519	-52.0063	19.6853	.344036	268.6	-8.69E-03	-.343927
36	-122.519	-52.0063	24.6067	.326853	266.8	-.0182327	-.326344
37	-122.519	-52.0063	29.528	.307001	265.2	-.0256062	-.305932
38	-122.519	-52.0063	34.4493	.284461	263.8	-.0308985	-.282778
39	-122.519	-52.0063	39.3707	.259245	262.4	-.0341682	-.256984
40	-122.519	-52.0063	44.292	.231393	261.2	-.0354581	-.228661
41	-122.519	-52.0063	49.2133	.200947	260.	-.0348003	-.197911
42	-122.519	-52.0063	54.1347	.167929	258.9	-.0322158	-.16481
43	-122.519	-52.0063	59.056	.132298	257.9	-.0277039	-.129364
44	-122.519	-52.0063	63.9773	.0938317	256.9	-.0212116	-.0914027
45	-122.519	-52.0063	68.8987	.0518012	256.	-.0125415	-.0502601
END	-122.519	-52.0063	73.82	0	0	0	0

APPENDIX D

DETUNE MODEL

ELECTRICAL DESCRIPTION –TOWER #2 DETUNE

Frequencies (MHz)

	frequency		no. of	segment length (wavelengths)	
no.	lowest	step	steps	minimum	maximum
1	1.01	0	1	.0129315	.0129315

Plane wave source

	zenith angle (deg)	= 90
	increment (deg)	= 0
	number of angles	= 1
	azimuth angle (deg)	= 0
	increment (deg)	= 90
	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	.01	0	.109	0	0

GEOMETRY – TOWER #2 DETUNE

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

wire	caps	Distance	Angle	Z	radius	segs
1	none	0	0	0	.194	15
		0	0	69.83		

Number of wires = 1
current nodes = 15

	minimum		maximum	
Individual wires	wire	value	wire	value
segment length	1	4.65533	1	4.65533
radius	1	.194	1	.194

RMS CURRENTS – TOWER #2 DETUNE

CURRENT rms
Frequency = 1.01 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	.0786395	270.	2.79E-05	-.0786395
2	0	0	4.65533	.0522941	270.	1.89E-05	-.0522941
3	0	0	9.31067	.0351844	270.	1.32E-05	-.0351844
4	0	0	13.966	.0211023	270.	8.45E-06	-.0211023
5	0	0	18.6213	9.27E-03	270.	4.52E-06	-9.27E-03
6	0	0	23.2767	6.15E-04	89.9	1.26E-06	6.15E-04
7	0	0	27.932	8.69E-03	90.	-1.37E-06	8.69E-03
8	0	0	32.5873	.0150152	90.	-3.42E-06	.0150152
9	0	0	37.2427	.0196161	90.	-4.9E-06	.0196161
10	0	0	41.898	.0224989	90.	-5.83E-06	.0224989
11	0	0	46.5533	.0236551	90.	-6.22E-06	.0236551
12	0	0	51.2087	.0230617	90.	-6.1E-06	.0230617
13	0	0	55.864	.0206737	90.	-5.46E-06	.0206737
14	0	0	60.5193	.0163972	90.	-4.3E-06	.0163972
15	0	0	65.1747	.0100112	90.	-2.6E-06	.0100112
END	0	0	69.83	0	0	0	0

ELECTRICAL DESCRIPTION – TOWER #3 DETUNE

Frequencies (MHz)

no.	frequency lowest	step	no. of steps	segment length (wavelengths) minimum	maximum
1	1.01	0	1	.0136704	.0136704

Plane wave source

zenith angle (deg)	=	90
increment (deg)	=	0
number of angles	=	1
azimuth angle (deg)	=	0
increment (deg)	=	90
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	.01	0	.104	0	0

GEOMETRY – TOWER #3 DETUNE

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

wire	caps	Distance	Angle	Z	radius	segs
1	none	0	0	0	.194	15
		0	0	73.82		

Number of wires = 1
current nodes = 15

	minimum wire	minimum value	maximum wire	maximum value
Individual wires				
segment length	1	4.92133	1	4.92133
radius	1	.194	1	.194

RMS CURRENTS – TOWER #3 DETUNE

Frequency = 1.01 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	.0867903	270.	4.55E-05	-.0867903
2	0	0	4.92133	.0580318	270.	3.09E-05	-.0580318
3	0	0	9.84267	.0391754	270.	2.14E-05	-.0391754
4	0	0	14.764	.0236057	270.	1.36E-05	-.0236057
5	0	0	19.6853	.0104881	270.	7.08E-06	-.0104881
6	0	0	24.6067	4.98E-04	89.8	1.7E-06	4.98E-04
7	0	0	29.528	9.49E-03	90.	-2.65E-06	9.49E-03
8	0	0	34.4493	.016543	90.	-6.03E-06	.016543
9	0	0	39.3707	.0216832	90.	-8.45E-06	.0216832
10	0	0	44.292	.0249107	90.	-9.96E-06	.0249107
11	0	0	49.2133	.0262132	90.	-1.06E-05	.0262132
12	0	0	54.1347	.0255642	90.	-1.03E-05	.0255642
13	0	0	59.056	.0229142	90.	-9.21E-06	.0229142
14	0	0	63.9773	.0181624	90.	-7.24E-06	.0181624
15	0	0	68.8987	.0110688	90.	-4.37E-06	.0110688
END	0	0	73.82	0	0	0	0