7136 S Yale Ave
Suite 501
Tulsa, OK 74133

o 918.664.4581
f 918.664.3066

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

December 10, 2021

VIA EMAIL

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

RE: IHM LICENSES, LLC (FRN No. 0014042816)
Application for New License on FCC Form 302-AM
KTSM (AM), 690 kHz, El Paso, TX; Facility ID No. 69561

Dear Ms. Dortch:

On behalf of IHM LICENSES, LLC, the licensee of the above-referenced station, enclosed is copy of an application for New License submitted on FCC Form 302-AM.

Also enclosed is Form 159, Remittance Advice, with credit card payment of the $1905.00 filing fee.

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

Online Payment Information

Total Amount	$1,905.00
Payer FRN	0014042816
Payer Name	iHM Licenses, LLC
Remittance ID	3701238
Treasury Tracking ID	26UA8QQ5

Thank you for your payment!

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)
918-664-4611	KTSM	69561

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
KTSM	El Paso, Texas			

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. N/A

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. N/A

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 G. Langham	Troy Langham Digitally signed by Troy Langham DN: cn=Troy Langham, o, ou, email=Troylangham@iheartmedia.com, c=US Date: 2021.12.10 13:04:05 -06'00'	
Title	Date	Telephone Number
VP, Technical Regulatory Affairs	12/10/2021	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 Licenses LLC

PURPOSE OF AUTHORIZATION APPLIED FOR: (check one)

☐ Station License ☑ Direct Measurement of Power

1. Facilities authorized in construction permit

Call Sign	File No. of Construction Permit (if applicable)	Frequency (kHz)	Hours of Operation	Power in kilowatts	
				Night	Day
KTSM		690	UNLIMITED	10	10

2. Station location

State	City or Town
Texas	El Paso

3. Transmitter location

State	County	City or Town	Street address (or other identification)
TX	El Paso	El Paso	12379 O'Brian St

4. Main studio location

State	County	City or Town	Street address (or other identification)
TX	El Paso	El Paso	4045 N Mesa St

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

State	County	City or Town	Street address (or other identification)
TX	El Paso	El Paso	4045 N Mesa St

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.

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
14.5	14.5

Measured antenna or common point resistance (in ohms) at operating frequency		Measured antenna or common point reactance (in ohms) at operating frequency	
Night	Day	Night	Day
50.0	50	5	7

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
Tower #1 (South West) (ASR 1045484)	0	-146.3	1	0.314	N/A	N/A
Tower #2 (North West (ASR 1045487)	86.5	0	1.13	1	N/A	N/A
Tower #3 (North East) (ASR 1045486)	86.3	14.84	1.06	0.52	N/A	N/A
Tower #4 (South East) (ASR 1045485)	-0.2	98.5	0.88	0.303	N/A	N/A

Manufacturer and type of antenna monitor: Potomac AM-19

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.
4 guyed uniform towers	4x 106.7	4x 108.4	4x 109.6	Exhibit No.

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
31 ° 58 ' 11 "	106 ° 21 ' 15 "

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.

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

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

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

see technical narrative

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)
Nicolas Blomstrand	Nicolas Blomstrand
Address (include ZIP Code) 1780 180th St. Centuria, WI 54824	Date 12/9/2021 Telephone No. (Include Area Code) 715-808-2132

☑ Technical Director ☐ Registered Professional Engineer

☐ Chief Operator ☐ Technical Consultant

☐ Other (specify)

APPLICATION FOR LICENSE INFORMATION

RADIO STATION KTSM

IHM LICENSES, LLC

El Paso, Texas

FID 69561

690 KHZ 10KW DA Day, 10KW DA Night

December 9, 2021

APPLICATION FOR LICENSE INFORMATION
RADIO STATION KTSM
El Paso, Texas

690 KHZ 10KW DA Day, 10KW DA Night

Table of Contents

EXECUTIVE SUMMARY

This engineering exhibit has been prepared in support of an application for licensing for radio station KTSM, El Paso Texas, Facility ID #69561. Measurements included comply with the requirements of Rule Section 73.151c. Station KTSM was adjusted to operating parameters computed using the Moment Method process as described in Rule Section 73.151c. MiniNEC Broadcast Professional version 14.6 by EM Scientific Inc. was used in the analysis.

The system has been adjusted to produce directional antenna parameters within+/-5% in ratio and +/-3 degrees in phase of the modeled values as prescribed in the Rules.

All measurements contained in this report were made by Mr. Nicolas Blomstrand of the iHeart Media Corporate Engineering Staff or the undersigned.

Please refer any questions regarding this report to:

Jacob A Wyatt
jakewyatt@iheartmedia.com
308-289-1872

Analysis of Tower Impedance Measurements to Verify Method of Moments Model

Impedance measurements were made of the individual towers with the other tower bases open. Measurements were made using a Keysight P5020A vector network analyzer and a Tunwall Radio directional coupler in a calibrated measurement system. Measurements were made immediately adjacent to the toroidal antenna sampling transformers, inside the antenna coupling units. An assumption is made regarding the sum of the tower base and base region stray capacitance as it pertains to each tower base calculation. Calculations were then made to relate modeled impedance of each tower to the measured impedance found at the output of each ATU.

The measured and modeled impedances were correlated using the Westberg Consulting WCAP Pro software program. WCAP is based on the SPICE nodal analysis program.

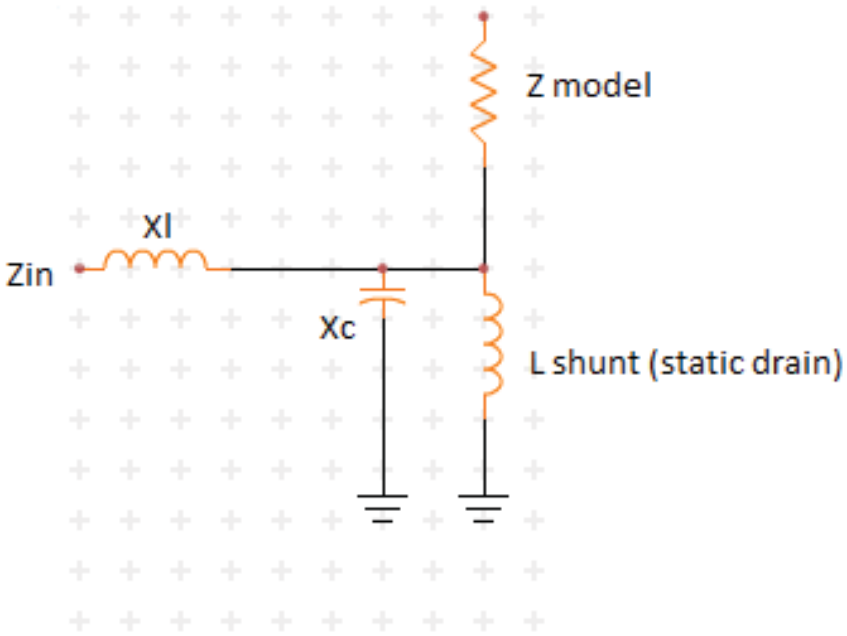
The shunt capacitive reactance of the tower base insulator is represented in the drawing below as Xc. The series inductive reactance of the tower feed conductor is represented as Xl. Z model represents the modeled impedance of the tower and Zin represents the impedance measured at the sampling point.

For these towers, there is a parallel shunt 120 uH coil across the tower to ground being used as a static drain (Nodes 2-0, parallel to Xc). The measurements of these coils are added to the tabulations on the next page. In the following WCAP tabulations, the modeled impedance is represented between nodes 3-0. The measured impedance is represented between nodes 2-0. Node 0 represents ground. The calculated reference point impedances appear under the “TO NODE IMPEDANCE” columns of the WCAP calculations, following the insignificantly short

transmission line (TL 1-3) that was included in series with the drive current sources (I 0-1) to provide calculation points for the impedances.

All tower models were calculated using the commissions currently published theoretical parameters.

The modeled and measured tower impedances are tabulated below and are shown to agree within the +/- 2ohms and +/- 4% as required by the rules.



Tower	L (uH) Shunt	L (uh) input	Xl (+j)	Xc (-j)	Z Modeled	Z in Modeled	Z in Measured
1	120	0.1	0.43	-3844	49.649 + j48.344	42.29 + j48.41	42.63 + j45.42
2	106	2.5	10.83	-3075	44.153 + j31.084	39.25 + j43.264	39.77 + j44.08
3	101	4.5	19.51	-3075	44.475 + j31.083	39.25 + j52.032	38.69 + j51.64
4	102	1.4	6.07	-3075	49.844 + j48.307	41.36 + j53.895	41.33 + j53.11

Method of Moments Model Details for Towers Driven Individually

The antenna array was modeled using Expert MININEC Broadcast Professional Version 14.6. Tower geometry was defined based upon values gathered from the Commission's database. A single wire was used to represent each tower in the array. Each tower was then divided up into 12 segments, thus producing a wire segmentation of approximately 7.6 to 7.916 degrees/segment.

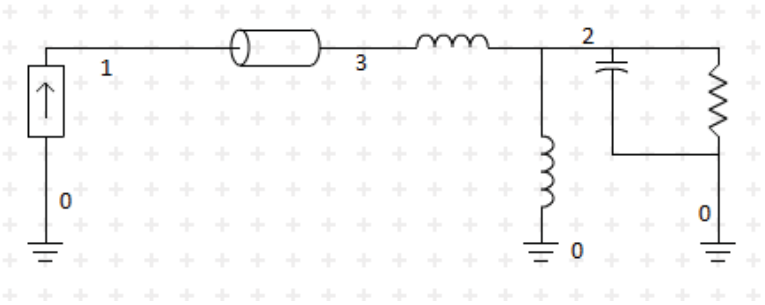
Tower parameters were modified to provide the required impedance match, that when combined with a circuit model containing base capacitance and series hookup inductance, equals the measured impedance of each tower while the other towers were open circuited.

Heights of the towers were adjusted as permitted by Rule Section 73.151(c)(1).
The tower radii were modeled at their actual values. Tabulations below show the parameters that were used for each tower in the Method of Moments model.

Tower	Actual Height Degrees	Model Height Degrees	Model Percent of Height
1	88.4	95.0	107.5
2	88.4	92.0	104.1
3	88.4	92.0	104.1
4	88.4	95.0	107.5

Following pages show the details from the method of moments models for each tower in addition to the WCAP circuit analysis for each tower.

WCAP – **KTSM Tower 1 Driven, others floated**



WCAP OUTPUT AT FREQUENCY: 0.690 MHz

NODE VOLTAGES
Node: 1 296.9909 ∡ 43.4603° V
Node: 2 295.4847 ∡ 43.2047° V
Node: 3 296.9902 ∡ 43.4602° V

WCAP PART		CURRENT IN	CURRENT OUT
TL	1→3	50.00000000 4.62 ∡ -5.400° A	4.62 ∡ -5.400° A

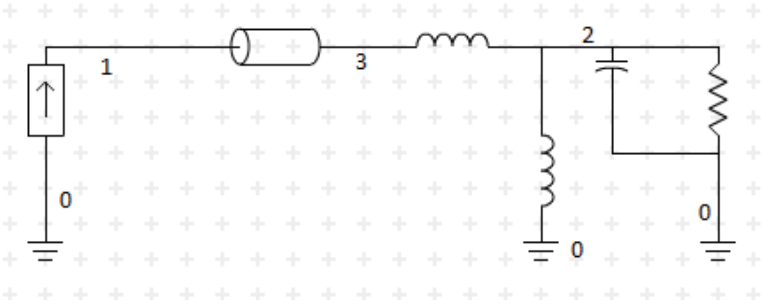
WCAP PART		BRANCH VOLTAGE	BRANCH CURRENT
R	2→0	49.64900000 295.48 ∡ 43.205° V	4.26 ∡ -1.032° A
C	2→0	0.00006000 295.48 ∡ 43.205° V	0.08 ∡ 133.205° A
L	3→2	0.10000000 2.00 ∡ 84.600° V	4.62 ∡ -5.400° A
L	2→0	120.00000000 295.48 ∡ 43.205° V	0.57 ∡ -46.795° A

WCAP PART		FROM IMPEDANCE	TO IMPEDANCE
R	2→0	49.64900000 49.65 + j 48.344	0.00 + j 0.000
C	2→0	0.00006000 0.00 - j 3844.322	0.00 + j 0.000
L	3→2	0.10000000 42.29 + j 48.412	42.29 + j 47.979
TL	1→3	50.00000000 42.29 + j 48.413	**42.29 + j 48.412**
L	2→0	120.00000000 0.00 + j 520.248	0.00 + j 0.000

WCAP PART		VSWR
TL	1→3	50.00000000 2.7763

WCAP INPUT DATA:
0.6900 0.00000000 0
R 49.64900000 2 0 48.34400000
C 0.00006000 2 0
L 0.10000000 3 2 0.00000000
TL 50.00000000 1 3 100.00000000 0.00100000 0.00000000
I 4.62000000 0 1 354.60000000
L 120.00000000 2 0 0.00000000

WCAP – **KTSM Tower 2 Driven, others floated**



WCAP OUTPUT AT FREQUENCY: 0.690 MHz

NODE VOLTAGES
Node: 1 58.4125 ∡ 47.7885° V
Node: 2 50.9081 ∡ 39.5644° V
Node: 3 58.4123 ∡ 47.7884° V

WCAP PART		CURRENT IN	CURRENT OUT
TL	1→3 50.00000000	1.00 ∡ 0.000° A	1.00 ∡ -0.000° A

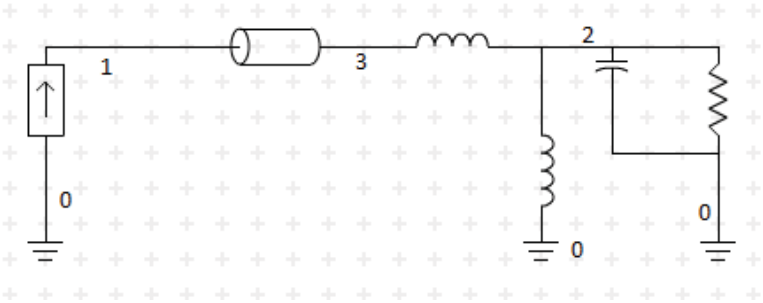
WCAP PART		BRANCH VOLTAGE	BRANCH CURRENT
R	2→0 44.15300000	50.91 ∡ 39.564° V	0.94 ∡ 4.419° A
C	2→0 0.00007500	50.91 ∡ 39.564° V	0.02 ∡ 129.564° A
L	3→2 2.50000000	10.84 ∡ 90.000° V	1.00 ∡ -0.000° A
L	2→0 106.00000000	50.91 ∡ 39.564° V	0.11 ∡ -50.436° A

WCAP PART		FROM IMPEDANCE	TO IMPEDANCE
R	2→0 44.15300000	44.15 + j 31.084	0.00 + j 0.000
C	2→0 0.00007500	0.00 - j 3075.458	0.00 + j 0.000
L	3→2 2.50000000	39.25 + j 43.264	39.25 + j 32.426
TL	1→3 50.00000000	39.25 + j 43.264	**39.25 + j 43.264**
L	2→0 106.00000000	0.00 + j 459.552	0.00 + j 0.000

WCAP PART		VSWR
TL	1→3 50.00000000	2.6330

WCAP INPUT DATA:
0.6900 0.00000000 0
R 44.15300000 2 0 31.08400000
C 0.00007500 2 0
L 2.50000000 3 2 0.00000000
TL 50.00000000 1 3 100.00000000 0.00100000 0.00000000
I 1.00000000 0 1 0.00000000
L 106.00000000 2 0 0.00000000

WCAP – **KTSM Tower 3 Driven, others floated**



WCAP OUTPUT AT FREQUENCY: 0.690 MHz

NODE VOLTAGES
Node: 1 65.1774 ∠ 52.9692° V
Node: 2 50.9752 ∠ 39.6430° V
Node: 3 65.1772 ∠ 52.9691° V

WCAP PART		CURRENT IN	CURRENT OUT
TL	1→3 50.00000000	1.00 ∠ 0.001° A	1.00 ∠ -0.000° A

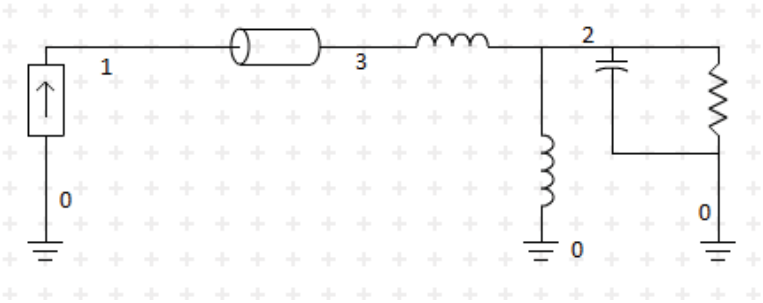
WCAP PART		BRANCH VOLTAGE	BRANCH CURRENT
R	2→0 44.47500000	50.98 ∠ 39.643° V	0.94 ∠ 4.694° A
C	2→0 0.00007500	50.98 ∠ 39.643° V	0.02 ∠ 129.643° A
L	3→2 4.50000000	19.51 ∠ 90.000° V	1.00 ∠ -0.000° A
L	2→0 101.00000000	50.98 ∠ 39.643° V	0.12 ∠ -50.357° A

WCAP PART		FROM IMPEDANCE	TO IMPEDANCE
R	2→0 44.47500000	44.48 + j 31.083	0.00 + j 0.000
C	2→0 0.00007500	0.00 - j 3075.458	0.00 + j 0.000
L	3→2 4.50000000	39.25 + j 52.032	39.25 + j 32.522
TL	1→3 50.00000000	39.25 + j 52.032	**39.25 + j 52.032**
L	2→0 101.00000000	-0.00 + j 437.875	0.00 + j 0.000

WCAP PART		VSWR
TL	1→3 50.00000000	3.1175

WCAP INPUT DATA:
0.6900 0.00000000 0
R 44.47500000 2 0 31.08300000
C 0.00007500 2 0
L 4.50000000 3 2 0.00000000
TL 50.00000000 1 3 100.00000000 0.00100000 0.00000000
I 1.00000000 0 1 0.00000000
L 101.00000000 2 0 0.00000000

WCAP – **KTSM Tower 4 Driven, others floated**



WCAP OUTPUT AT FREQUENCY: 0.690 MHz

NODE VOLTAGES
Node: 1 67.9365 ∡ 52.4966° V
Node: 2 63.2293 ∡ 49.1461° V
Node: 3 67.9364 ∡ 52.4965° V

WCAP PART		CURRENT IN	CURRENT OUT
TL	1→3 50.00000000	1.00 ∡ 0.001° A	1.00 ∡ -0.000° A

WCAP PART		BRANCH VOLTAGE	BRANCH CURRENT
R	2→0 49.84400000	63.23 ∡ 49.146° V	0.91 ∡ 5.043° A
C	2→0 0.00007500	63.23 ∡ 49.146° V	0.02 ∡ 139.146° A
L	3→2 1.40000000	6.07 ∡ 90.000° V	1.00 ∡ -0.000° A
L	2→0 102.00000000	63.23 ∡ 49.146° V	0.14 ∡ -40.854° A

WCAP PART		FROM IMPEDANCE	TO IMPEDANCE
R	2→0 49.84400000	49.84 + j 48.307	0.00 + j 0.000
C	2→0 0.00007500	0.00 - j 3075.458	0.00 + j 0.000
L	3→2 1.40000000	41.36 + j 53.895	41.36 + j 47.825
TL	1→3 50.00000000	41.36 + j 53.895	**41.36 + j 53.895**
L	2→0 102.00000000	0.00 + j 442.211	0.00 + j 0.000

WCAP PART		VSWR
TL	1→3 50.00000000	3.1202

WCAP INPUT DATA:
0.6900 0.00000000 0
R 49.84400000 2 0 48.30700000
C 0.00007500 2 0
L 1.40000000 3 2 0.00000000
TL 50.00000000 1 3 100.00000000 0.00100000 0.00000000
I 1.00000000 0 1 0.00000000
L 102.00000000 2 0 0.00000000

Tower 1 driven, others floated

```
IMPEDANCE
   normalization = 50.
freq     resist   react    imped    phase    VSWR    S11      S12
(MHz)    (ohms)   (ohms)   (ohms)   (deg)            dB       dB
source =  1; node 1, sector 1
.69      49.649   48.344   69.298   44.2     2.5493  -7.2003  -.91801

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

wire  caps Distance     Angle        Z            radius      segs
 1    none 0            0            0            .291         12
           0            0            95.
 2    none 100.         200.         0            .291         12
           100.         200.         92.
 3    none 190.         110.         0            .291         12
           190.         110.         92.
 4    none 214.7        137.76       0            .291         12
           214.7        137.76       95.

Number of wires          =  4
          current nodes  =  48

                        minimum                  maximum
Individual wires      wire    value            wire  value
segment length         2      7.66667           1    7.91667
radius                 1      .291              1    .291


ELECTRICAL DESCRIPTION
Frequencies (MHz)
     frequency               no. of  segment length (wavelengths)
 no. lowest       step        steps   minimum        maximum
 1   .69          0            1      .0212963       .0219907

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

Lumped loads
             resistance    reactance     inductance  capacitance passive
load  node   (ohms)        (ohms)        (mH)        (uF)        circuit
 1     13    0             540.          0           0            0
 2     25    0             511.          0           0            0
 3     37    0             516.          0           0            0
```

Tower 2 driven, others floated

```
IMPEDANCE
   normalization = 50.
freq     resist   react    imped    phase    VSWR    S11      S12
(MHz)    (ohms)   (ohms)   (ohms)   (deg)            dB       dB
source =  1; node 13, sector 1
.69      44.153   31.084   53.998   35.1     1.9369  -9.9242  -.46608

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

wire  caps Distance     Angle        Z            radius      segs
 1    none 0            0           0            .291         12
           0            0           95.
 2    none 100.         200.        0            .291         12
           100.         200.        92.
 3    none 190.         110.        0            .291         12
           190.         110.        92.
 4    none 214.7        137.76      0            .291         12
           214.7        137.76      95.

Number of wires          =  4
          current nodes  =  48

                        minimum                  maximum
Individual wires      wire    value            wire  value
segment length         2      7.66667           1    7.91667
radius                 1      .291              1    .291


ELECTRICAL DESCRIPTION
Frequencies (MHz)
     frequency               no. of  segment length (wavelengths)
 no. lowest       step        steps   minimum        maximum
 1   .69          0            1      .0212963       .0219907

Sources
source node    sector  magnitude      phase          type
 1      13      1       1.             0              voltage

Lumped loads
             resistance    reactance     inductance  capacitance passive
load  node   (ohms)        (ohms)        (mH)        (uF)        circuit
 1     1     0             602.          0           0            0
 2     25    0             511.          0           0            0
 3     37    0             516.          0           0            0
```

Tower 3 driven, others floated

```
IMPEDANCE
   normalization = 50.
freq     resist   react    imped    phase    VSWR    S11      S12
(MHz)    (ohms)   (ohms)   (ohms)   (deg)            dB       dB
source =  1; node 25, sector 1
.69      44.475   31.083   54.26    34.9     1.9301  -9.9671  -.46124

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

wire  caps Distance     Angle        Z            radius      segs
 1    none 0            0            0            .291         12
           0            0            95.
 2    none 100.         200.         0            .291         12
           100.         200.         92.
 3    none 190.         110.         0            .291         12
           190.         110.         92.
 4    none 214.7        137.76       0            .291         12
           214.7        137.76       95.

Number of wires          =  4
          current nodes  =  48

                        minimum                  maximum
Individual wires      wire    value            wire  value
segment length         2      7.66667           1    7.91667
radius                 1      .291              1    .291


ELECTRICAL DESCRIPTION
Frequencies (MHz)
     frequency               no. of  segment length (wavelengths)
 no. lowest       step        steps   minimum        maximum
 1   .69          0            1      .0212963       .0219907

Sources
source node    sector  magnitude      phase          type
 1      25      1       1.             0              voltage

Lumped loads
            resistance    reactance     inductance  capacitance passive
load  node  (ohms)        (ohms)        (mH)        (uF)        circuit
 1     1    0             602.          0           0            0
 2     13   0             540.          0           0            0
 3     37   0             516.          0           0            0
```

Tower 4 driven, others floated

```
IMPEDANCE
   normalization = 50.
freq     resist   react    imped    phase    VSWR    S11      S12
(MHz)    (ohms)   (ohms)   (ohms)   (deg)            dB       dB
source =  1; node 37, sector 1
.69      49.844   48.307   69.412   44.1     2.5432  -7.2196  -.91348

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

wire  caps Distance     Angle        Z            radius      segs
 1    none 0            0            0            .291         12
           0            0            95.
 2    none 100.         200.         0            .291         12
           100.         200.         92.
 3    none 190.         110.         0            .291         12
           190.         110.         92.
 4    none 214.7        137.76       0            .291         12
           214.7        137.76       95.

Number of wires          =  4
          current nodes  =  48

                        minimum                  maximum
Individual wires      wire    value            wire  value
segment length         2      7.66667           1    7.91667
radius                 1      .291              1    .291


ELECTRICAL DESCRIPTION
Frequencies (MHz)
     frequency               no. of  segment length (wavelengths)
 no. lowest       step        steps   minimum        maximum
 1   .69          0            1      .0212963       .0219907

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

Lumped loads
            resistance    reactance     inductance  capacitance passive
load  node  (ohms)        (ohms)        (mH)        (uF)        circuit
 1     1    0             602.          0           0            0
 2     13   0             540.          0           0            0
 3     25   0             511.          0           0            0
```

CURRENT NODES

	coordinates (degrees)			connections		node
wire	X	Y	Z	end1	end2	no.
1	0	0	0	GND	1	1
1	0	0	7.91667	1	1	2
1	0	0	15.8333	1	1	3
1	0	0	23.75	1	1	4
1	0	0	31.6667	1	1	5
1	0	0	39.5833	1	1	6
1	0	0	47.5	1	1	7
1	0	0	55.4167	1	1	8
1	0	0	63.3333	1	1	9
1	0	0	71.25	1	1	10
1	0	0	79.1667	1	1	11
1	0	0	87.0833	1	END	12
2	-93.9693	34.202	0	GND	2	13
2	-93.9693	34.202	7.66667	2	2	14
2	-93.9693	34.202	15.3333	2	2	15
2	-93.9693	34.202	23.	2	2	16
2	-93.9693	34.202	30.6667	2	2	17
2	-93.9693	34.202	38.3333	2	2	18
2	-93.9693	34.202	46.	2	2	19
2	-93.9693	34.202	53.6667	2	2	20
2	-93.9693	34.202	61.3333	2	2	21
2	-93.9693	34.202	69.	2	2	22
2	-93.9693	34.202	76.6667	2	2	23
2	-93.9693	34.202	84.3333	2	END	24
3	-64.9838	-178.542	0	GND	3	25
3	-64.9838	-178.542	7.66667	3	3	26
3	-64.9838	-178.542	15.3333	3	3	27
3	-64.9838	-178.542	23.	3	3	28
3	-64.9838	-178.542	30.6667	3	3	29
3	-64.9838	-178.542	38.3333	3	3	30
3	-64.9838	-178.542	46.	3	3	31
3	-64.9838	-178.542	53.6667	3	3	32
3	-64.9838	-178.542	61.3333	3	3	33
3	-64.9838	-178.542	69.	3	3	34
3	-64.9838	-178.542	76.6667	3	3	35
3	-64.9838	-178.542	84.3333	3	END	36
4	-158.95	-144.329	0	GND	4	37
4	-158.95	-144.329	7.91667	4	4	38
4	-158.95	-144.329	15.8333	4	4	39
4	-158.95	-144.329	23.75	4	4	40
4	-158.95	-144.329	31.6667	4	4	41
4	-158.95	-144.329	39.5833	4	4	42
4	-158.95	-144.329	47.5	4	4	43
4	-158.95	-144.329	55.4167	4	4	44
4	-158.95	-144.329	63.3333	4	4	45
4	-158.95	-144.329	71.25	4	4	46
4	-158.95	-144.329	79.1667	4	4	47
4	-158.95	-144.329	87.0833	4	END	48

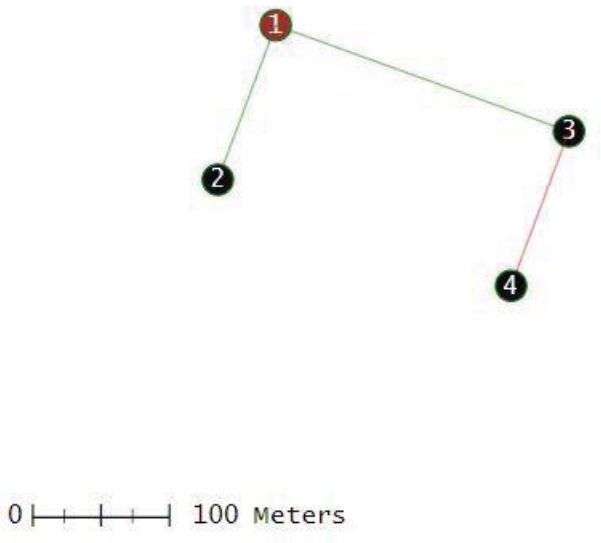
Derivation of Operating Parameters, Daytime Directional Array

Following verification of the moment method model of the individual array elements, by comparison of the measured and modeled base impedances, directional antenna array base parameters were calculated. Calculations were made to determine the complex voltage sources which when applied to the base of each array element produce current moment sums which when normalized, equate to the theoretical field parameters of the authorized directional pattern. Using these voltages, the tower currents were calculated. The currents at the ATU sampling points were related to those of the moment method model by using the WCAP Pro nodal analysis program from Westberg Consulting. The assumptions that were used for the single tower calculations were used in the directional array case as well. In the following WCAP calculations node 2 represents the reference point, node 3 represents the tower feed point, and node 0 represents ground. The tower operating impedance is represented from node 3 to ground (R 3-0). The current magnitude and phases at the sample point is represented following the insignificantly short transmission line (TL 1-2). The value shown at TL 1-2 has been rounded by the program. The actual current values shown as "I" in the "WCAP INPUT DATA" represent the values before rounding and were used in the calculation of antenna monitor amplitude and phase indications to yield greater accuracy.

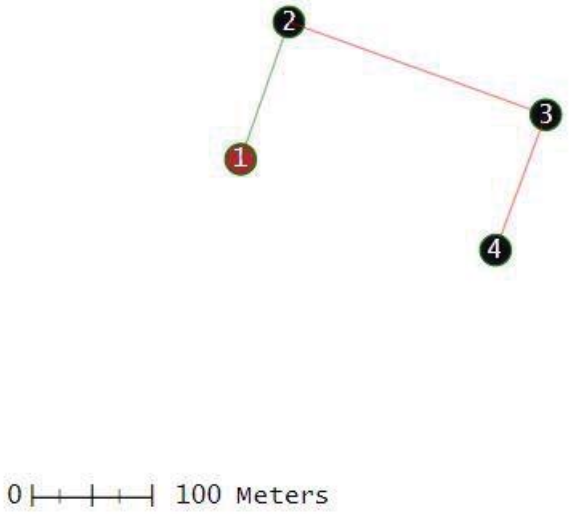
In so much as the sample lines are equal in length and the sample toroids responses are identical, the antenna monitor amplitudes and phases have been calculated directly from the reference point currents and phases.

We would like to make note to the commission that all modeling herein follows the on site tower numbering. These differ from what the commission has on file since the night and day patterns keep a similar numbering scheme, whereas the commission has it on file that the numbering for towers 1 and 2 invert from day to night pattern. We want to make it abundantly clear that the onsite antenna monitor and schematics reflect the tower numbers varied from what the commission has on file.

The commission has on file that the following diagrams for the day and night tower numbering respectively. The reference towers are denoted by being highlighted in the diagrams. North being towards the top of the page.



*This image above denotes the currently FCC tower numbering scheme for the day pattern.



*This image above denotes the currently FCC tower numbering scheme for the night pattern.

The onsite antenna monitor, onsite schematics, and phasing documentation keep the same numbering scheme so that the night pattern numbering (lower diagram) stays as a constant. Thus, tower number 2 is the reference tower for the day pattern, and tower number 1 is the reference tower for the night pattern. We ask that the commission consider changing the theoretical pattern numbering scheme to match the current onsite antenna monitor numbers so as to reduce confusion in the future.

Calculated Day Parameters

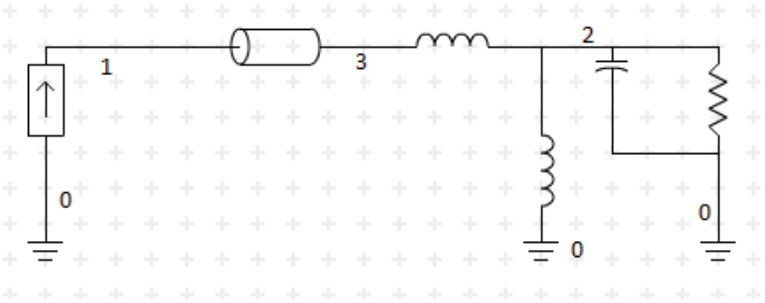
Tower	Model Pulse	Model Current Magnitude At Toroid, Amps	Model Current Phase at Toroid, Degrees	Modeled Antenna Monitor Ratio	Modeled Antenna Monitor Phase, Degrees
1	1	14.48	0.36	1	0
2	13	4.55	214.1	0.314	-146.3
3	25	7.525	15.188	0.520	14.84
4	37	4.389	98.835	0.303	98.5

Calculated Antenna Monitor Day Parameters

Tower	Model Pulse	Model Current Magnitude At Toroid, Amps	Model Current Phase at Toroid, Degrees	Modeled Antenna Monitor Ratio	Modeled Antenna Monitor Phase, Degrees
1	13	4.55	214.1	0.314	-146.3
2	1	14.48	0.36	1	0
3	25	7.525	15.188	0.520	14.84
4	37	4.389	98.835	0.303	98.5

**Proposed antenna parameters utilizing onsite antenna monitor numbering.

WCAP Circuit Diagram



WCAP - KTSM T1 Day
WCAP OUTPUT AT FREQUENCY: 0.690 MHz

NODE VOLTAGES
Node: 1 742.2767 ∠ 47.4204° V
Node: 2 737.6942 ∠ 47.0883° V
Node: 3 742.2744 ∠ 47.4203° V

WCAP PART		CURRENT IN	CURRENT OUT
TL	1→3 50.00000000	14.47 ∠ 0.360° A	14.47 ∠ 0.360° A

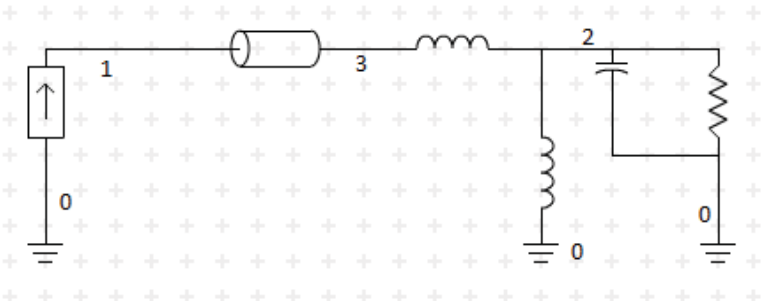
WCAP PART		BRANCH VOLTAGE	BRANCH CURRENT
R	2→0 39.54000000	737.69 ∠ 47.088° V	**13.60 ∠ 3.902° A**
C	2→0 0.00006000	737.69 ∠ 47.088° V	0.19 ∠ 137.088° A
L	3→2 0.10000000	6.27 ∠ 90.360° V	14.47 ∠ 0.360° A
L	2→0 120.00000000	737.69 ∠ 47.088° V	1.42 ∠ -42.912° A

WCAP PART		FROM IMPEDANCE	TO IMPEDANCE
R	2→0 39.54000000	39.54 + j 37.113	0.00 + j 0.000
C	2→0 0.00006000	0.00 - j 3844.322	0.00 + j 0.000
L	3→2 0.10000000	34.95 + j 37.553	34.95 + j 37.120
TL	1→3 50.00000000	34.95 + j 37.554	34.95 + j 37.553
L	2→0 120.00000000	-0.00 + j 520.248	0.00 + j 0.000

WCAP PART		VSWR
TL	1→3 50.00000000	2.5437

WCAP INPUT DATA:
0.6900 0.00000000 0
R 39.54000000 2 0 37.11300000
C 0.00006000 2 0
L 0.10000000 3 2 0.00000000
TL 50.00000000 1 3 100.00000000 0.00100000 0.00000000
I **14.47000000 0 1 0.36000000**
L 120.00000000 2 0 0.00000000

WCAP Circuit Diagram



WCAP – KTSM T2 Day
WCAP OUTPUT AT FREQUENCY: 0.690 MHz

NODE VOLTAGES
Node: 1 678.3369 ∠ -69.3440° V
Node: 2 630.4758 ∠ -70.3861° V
Node: 3 678.3359 ∠ -69.3440° V

WCAP PART		CURRENT IN	CURRENT OUT
TL	1→3 50.00000000	4.55 ∠ -145.900° A	4.55 ∠ -145.900° A

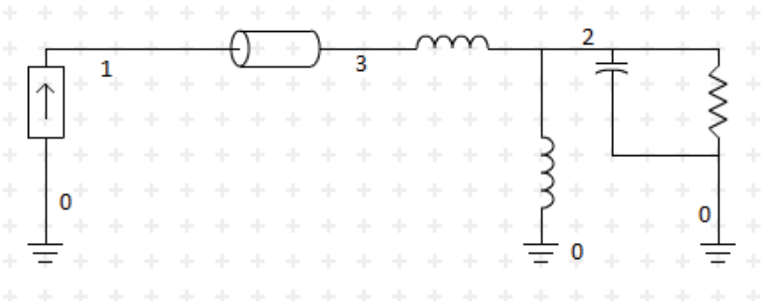
WCAP PART		BRANCH VOLTAGE	BRANCH CURRENT
R	2→0 60.89900000	630.48 ∠ -70.386° V	**3.43 ∠ -141.022° A**
C	2→0 0.00007500	630.48 ∠ -70.386° V	0.21 ∠ 19.614° A
L	3→2 2.50000000	49.32 ∠ -55.900° V	4.55 ∠ -145.900° A
L	2→0 106.00000000	630.48 ∠ -70.386° V	1.37 ∠ -160.386° A

WCAP PART		FROM IMPEDANCE	TO IMPEDANCE
R	2→0 60.89900000	60.90 + j 173.280	0.00 + j 0.000
C	2→0 0.00007500	0.00 - j 3075.458	0.00 + j 0.000
L	3→2 2.50000000	34.66 + j 144.998	34.66 + j 134.159
TL	1→3 50.00000000	34.66 + j 145.000	34.66 + j 144.998
L	2→0 106.00000000	0.00 + j 459.552	0.00 + j 0.000

WCAP PART		VSWR
TL	1→3 50.00000000	14.1969

WCAP INPUT DATA:
0.6900 0.00000000 0
R 60.89900000 2 0 173.28000000
C 0.00007500 2 0
L 2.50000000 3 2 0.00000000
TL 50.00000000 1 3 100.00000000 0.00100000 0.00000000
I **4.55000000 0 1 214.10000000**
L 106.00000000 2 0 0.00000000

WCAP Circuit Diagram



WCAP - KTSM T3 Day
WCAP OUTPUT AT FREQUENCY: 0.690 MHz

NODE VOLTAGES
Node: 1 422.5109 ∠ 71.2577° V
Node: 2 311.7531 ∠ 56.0236° V
Node: 3 422.5095 ∠ 71.2576° V

WCAP PART		CURRENT IN	CURRENT OUT
TL	1→3	50.00000000	7.52 ∠ 15.200° A	7.52 ∠ 15.200° A

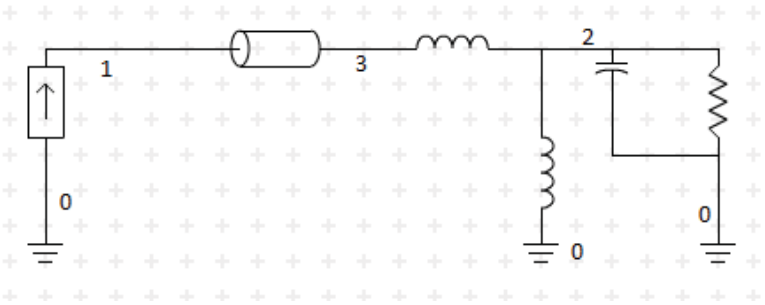
WCAP PART			BRANCH VOLTAGE	BRANCH CURRENT
R	2→0	34.84000000	311.75 ∠ 56.024° V	**7.14 ∠ 18.912° A**
C	2→0	0.00007500	311.75 ∠ 56.024° V	0.10 ∠ 146.024° A
L	3→2	4.50000000	146.71 ∠ 105.200° V	7.52 ∠ 15.200° A
L	2→0	101.00000000	311.75 ∠ 56.024° V	0.71 ∠ -33.976° A

WCAP PART			FROM IMPEDANCE	TO IMPEDANCE
R	2→0	34.84000000	34.84 + j 26.360	0.00 + j 0.000
C	2→0	0.00007500	0.00 - j 3075.458	0.00 + j 0.000
L	3→2	4.50000000	31.37 + j 46.611	31.37 + j 27.101
TL	1→3	50.00000000	31.37 + j 46.611	31.37 + j 46.611
L	2→0	101.00000000	0.00 + j 437.875	0.00 + j 0.000

WCAP PART			VSWR
TL	1→3	50.00000000	3.3036

WCAP INPUT DATA:
0.6900 0.00000000 0
R 34.84000000 2 0 26.36000000
C 0.00007500 2 0
L 4.50000000 3 2 0.00000000
TL 50.00000000 1 3 100.00000000 0.00100000 0.00000000
I **7.52000000 0 1 15.20000000**
L 101.00000000 2 0 0.00000000

WCAP Circuit Diagram



WCAP - KTSM T4 Day
WCAP OUTPUT AT FREQUENCY: 0.690 MHz

NODE VOLTAGES
Node: 1 282.3377 ∠ -179.5068° V
Node: 2 256.0143 ∠ 179.6283° V
Node: 3 282.3367 ∠ -179.5069° V

WCAP PART		CURRENT IN	CURRENT OUT
TL	1→3 50.00000000	4.39 ∠ 98.835° A	4.39 ∠ 98.835° A

WCAP PART		BRANCH VOLTAGE	BRANCH CURRENT
R	2→0 11.82000000	256.01 ∠ 179.628° V	**3.90 ∠ 100.000° A**
C	2→0 0.00007500	256.01 ∠ 179.628° V	0.08 ∠ -90.372° A
L	3→2 1.40000000	26.63 ∠ -171.165° V	4.39 ∠ 98.835° A
L	2→0 102.00000000	256.01 ∠ 179.628° V	0.58 ∠ 89.628° A

WCAP PART		FROM IMPEDANCE	TO IMPEDANCE
R	2→0 11.82000000	11.82 + j 64.580	0.00 + j 0.000
C	2→0 0.00007500	0.00 - j 3075.458	0.00 + j 0.000
L	3→2 1.40000000	9.33 + j 63.662	9.33 + j 57.592
TL	1→3 50.00000000	9.33 + j 63.662	9.33 + j 63.662
L	2→0 102.00000000	0.00 + j 442.211	0.00 + j 0.000

WCAP PART		VSWR
TL	1→3 50.00000000	14.1557

WCAP INPUT DATA:
0.6900 0.00000000 0
R 11.82000000 2 0 64.58000000
C 0.00007500 2 0
L 1.40000000 3 2 0.00000000
TL 50.00000000 1 3 100.00000000 0.00100000 0.00000000
I 4.38800000 0 1 98.83500000
L 102.00000000 2 0 0.00000000

MEDIUM WAVE ARRAY SYNTHESIS FROM FIELD RATIOS

Frequency = .69 MHz

tower	field ratio magnitude	phase (deg)
1	1.	0
2	.3	-145.8
3	.5	15.5
4	.3	98.7

VOLTAGES AND CURRENTS - rms

source node	voltage magnitude	phase (deg)	current magnitude	phase (deg)
1	737.567	47.1	13.6066	3.9
13	630.892	289.5	3.43239	219.
25	311.95	56.	7.1412	18.9
37	256.324	179.6	3.89972	100.

Sum of square of source currents = 526.252
Total power = 10,000. watts

TOWER ADMITTANCE MATRIX

admittance	real (mhos)	imaginary (mhos)
Y(1, 1)	.00976602	-.00682763
Y(1, 2)	.00588552	.00656408
Y(1, 3)	.00506912	.00137237
Y(1, 4)	.00267754	.0013712
Y(2, 1)	.00588525	.00656433
Y(2, 2)	.0141781	-.0064903
Y(2, 3)	.00418596	.00242186
Y(2, 4)	.00506947	.00137333
Y(3, 1)	.00506902	.00137251
Y(3, 2)	.00418596	.00242186
Y(3, 3)	.0141782	-.00649093
Y(3, 4)	.00588528	.00656442
Y(4, 1)	.00267754	.0013712
Y(4, 2)	.00506957	.00137319
Y(4, 3)	.00588555	.00656416
Y(4, 4)	.00976621	-.00682713

TOWER IMPEDANCE MATRIX

impedance	real (ohms)	imaginary (ohms)
Z(1, 1)	49.1989	48.2835
Z(1, 2)	19.7786	-23.7388
Z(1, 3)	-12.4063	-13.3846
Z(1, 4)	-17.3907	-6.35582
Z(2, 1)	19.7774	-23.7396
Z(2, 2)	43.7889	31.0752
Z(2, 3)	-15.3739	-5.81966
Z(2, 4)	-12.4046	-13.3873
Z(3, 1)	-12.4066	-13.3844
Z(3, 2)	-15.3739	-5.81965

Z(3, 3)	43.7887	31.0749
Z(3, 4)	19.777	-23.7395
Z(4, 1)	-17.3907	-6.35582
Z(4, 2)	-12.4044	-13.3875
Z(4, 3)	19.7782	-23.7388
Z(4, 4)	49.1988	48.283

IMPEDANCE
normalization = 50.

freq (MHz)	resist (ohms)	react (ohms)	imped (ohms)	phase (deg)	VSWR	S11 dB	S12 dB
source = 1; node 1, sector 1							
.69	39.538	37.082	54.207	43.2	2.3199	-8.0118	-.74719
source = 2; node 13, sector 1							
.69	61.513	173.21	183.81	70.4	11.712	-1.4869	-5.3773
source = 3; node 25, sector 1							
.69	34.813	26.387	43.683	37.2	2.0431	-9.3	-.54281
source = 4; node 37, sector 1							
.69	11.827	64.656	65.729	79.6	11.446	-1.5216	-5.2934

CURRENT rms
Frequency = .69 MHz
Input power = 10,000. watts
Efficiency = 100. %
coordinates in degrees

current no.	X	Y	Z	mag (amps)	phase (deg)	real (amps)	imaginary (amps)
GND	0	0	0	13.6066	3.9	13.5752	.923099
2	0	0	7.91667	13.8438	2.4	13.8319	.574433
3	0	0	15.8333	13.7391	1.4	13.735	.33718
4	0	0	23.75	13.3618	.6	13.361	.145248
5	0	0	31.6667	12.7278	360.	12.7278	-9.35E-03
6	0	0	39.5833	11.8511	359.4	11.8504	-.128951
7	0	0	47.5	10.747	358.9	10.7449	-.214246
8	0	0	55.4167	9.433	358.4	9.42926	-.265499
9	0	0	63.3333	7.92733	358.	7.92228	-.282942

10	0	0	71.25	6.24779	357.6	6.24209	-.266856
11	0	0	79.1667	4.40644	357.2	4.40108	-.217338
12	0	0	87.0833	2.39482	356.8	2.39111	-.133294
END	0	0	95.	0	0	0	0
GND	-93.9693	34.202	0	3.4324	219.	-2.66735	-2.16022
14	-93.9693	34.202	7.66667	3.80172	216.9	-3.04053	-2.28216
15	-93.9693	34.202	15.3333	3.97007	215.7	-3.22354	-2.31738
16	-93.9693	34.202	23.	4.01546	214.8	-3.29548	-2.29428
17	-93.9693	34.202	30.6667	3.94974	214.2	-3.26827	-2.21786
18	-93.9693	34.202	38.3333	3.77937	213.6	-3.14802	-2.09131
19	-93.9693	34.202	46.	3.5098	213.1	-2.93963	-1.91762
20	-93.9693	34.202	53.6667	3.14665	212.7	-2.64792	-1.69998
21	-93.9693	34.202	61.3333	2.69582	212.3	-2.27792	-1.44171
22	-93.9693	34.202	69.	2.16286	212.	-1.83433	-1.14595
23	-93.9693	34.202	76.6667	1.55133	211.7	-1.32012	-.814806
24	-93.9693	34.202	84.3333	.857171	211.4	-.731721	-.44646
END	-93.9693	34.202	92.	0	0	0	0
GND	-64.9838	-178.542	0	7.1412	18.9	6.75783	2.30834
26	-64.9838	-178.542	7.66667	7.21132	17.5	6.87569	2.17441
27	-64.9838	-178.542	15.3333	7.12327	16.7	6.82268	2.04746
28	-64.9838	-178.542	23.	6.90329	16.	6.63513	1.90538
29	-64.9838	-178.542	30.6667	6.55816	15.4	6.32134	1.74645
30	-64.9838	-178.542	38.3333	6.09428	14.9	5.88824	1.57125
31	-64.9838	-178.542	46.	5.51885	14.5	5.34319	1.38128
32	-64.9838	-178.542	53.6667	4.83991	14.1	4.69425	1.17845
33	-64.9838	-178.542	61.3333	4.066	13.7	3.94988	.96479
34	-64.9838	-178.542	69.	3.20509	13.4	3.11798	.742165
35	-64.9838	-178.542	76.6667	2.26214	13.1	2.2035	.51174
36	-64.9838	-178.542	84.3333	1.23132	12.8	1.20084	.272309
END	-64.9838	-178.542	92.	0	0	0	0
GND	-158.95	-144.329	0	3.89971	100.	-.676517	3.84058
38	-158.95	-144.329	7.91667	4.03967	99.5	-.669456	3.98382
39	-158.95	-144.329	15.8333	4.05416	99.2	-.651114	4.00154
40	-158.95	-144.329	23.75	3.97791	99.	-.621656	3.92904
41	-158.95	-144.329	31.6667	3.81756	98.8	-.58169	3.77299
42	-158.95	-144.329	39.5833	3.57789	98.6	-.532067	3.53811
43	-158.95	-144.329	47.5	3.26366	98.3	-.473834	3.22908
44	-158.95	-144.329	55.4167	2.88006	98.1	-.408189	2.85098
45	-158.95	-144.329	63.3333	2.43254	97.9	-.336415	2.40916
46	-158.95	-144.329	71.25	1.92632	97.8	-.259774	1.90872
47	-158.95	-144.329	79.1667	1.36486	97.5	-.179302	1.35303
48	-158.95	-144.329	87.0833	.745142	97.3	-.0952267	.739032
END	-158.95	-144.329	95.	0	0	0	0

Derivation of Operating Parameters, Nighttime

Directional Array

Following verification of the moment method model of the individual array elements, by comparison of the measured and modeled base impedances, directional antenna array base parameters were calculated. Calculations were made to determine the complex voltage sources which when applied to the base of each array element produce current moment sums which when normalized, equate to the theoretical field parameters of the authorized directional pattern. Using these voltages, the tower currents were calculated. The currents at the ATU sampling points were related to those of the moment method model by using the WCAP Pro nodal analysis program from Westberg Consulting. The assumptions that were used for the single tower calculations were used in the directional array case as well. In the following WCAP calculations node 2 represents the reference point, node 3 represents the tower feed point, and node 0 represents ground. The tower operating impedance is represented from node 3 to ground (R 3-0). The current magnitude and phases at the sample point is represented following the insignificantly short transmission line (TL 1-2). The value shown at TL 1-2 has been rounded by the program. The actual current values shown as "I" in the "WCAP INPUT DATA" represent the values before rounding and were used in the calculation of antenna monitor amplitude and phase indications to yield greater accuracy.

In so much as the sample lines are equal in length and the sample toroids responses are identical, the antenna monitor amplitudes and phases have been calculated directly from the reference point currents and phases.

Calculated Night Parameters

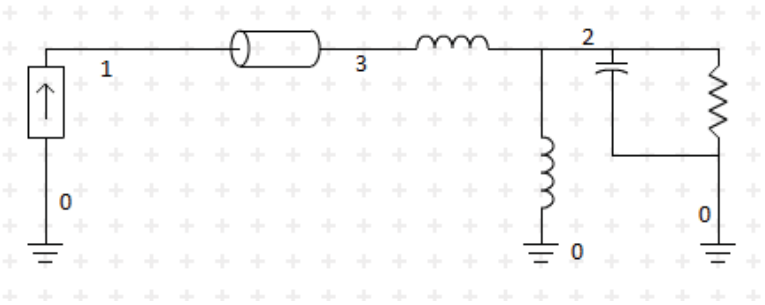
Tower	Model Pulse	Model Current Magnitude At Toroid, Amps	Model Current Phase at Toroid, Degrees	Modeled Antenna Monitor Ratio	Modeled Antenna Monitor Phase, Degrees
1	1	9.823	0.175	1.13	86.5
2	13	8.66	273.7	1	0
3	25	9.167	-0.017	1.06	86.3
4	37	7.592	273.49	0.88	-0.2

Calculated Antenna Monitor Night Parameters

Tower	Model Pulse	Model Current Magnitude At Toroid, Amps	Model Current Phase at Toroid, Degrees	Modeled Antenna Monitor Ratio	Modeled Antenna Monitor Phase, Degrees
1	13	8.66	273.7	1	0
2	1	9.823	0.175	1.13	86.5
3	25	9.167	-0.017	1.06	86.3
4	37	7.592	273.49	0.88	-0.2

**Proposed antenna parameters utilizing onsite antenna monitor numbering.

WCAP Circuit Diagram



WCAP - KTSM T1 Night
WCAP OUTPUT AT FREQUENCY: 0.690 MHz

NODE VOLTAGES
Node: 1 621.0179 ∠ -54.9855° V
Node: 2 577.8247 ∠ -62.9627° V
Node: 3 621.0169 ∠ -54.9857° V

WCAP PART		CURRENT IN	CURRENT OUT
TL	1→3 50.00000000	8.66 ∠ -86.300° A	8.66 ∠ -86.300° A

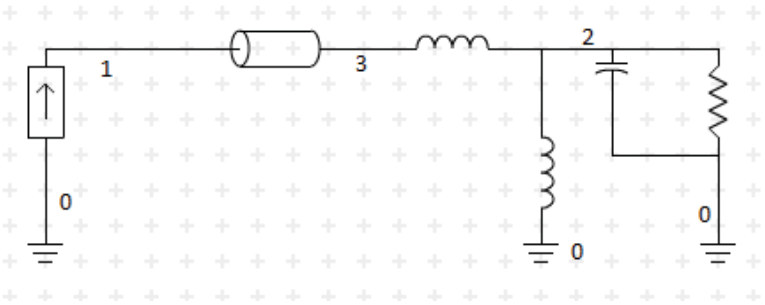
WCAP PART		BRANCH VOLTAGE	BRANCH CURRENT
R	2→0 66.78000000	577.82 ∠ -62.963° V	**8.29 ∠ -79.501° A**
C	2→0 0.00007500	577.82 ∠ -62.963° V	0.19 ∠ 27.037° A
L	3→2 2.50000000	93.86 ∠ 3.700° V	8.66 ∠ -86.300° A
L	2→0 106.00000000	577.82 ∠ -62.963° V	1.26 ∠ -152.963° A

WCAP PART		FROM IMPEDANCE	TO IMPEDANCE
R	2→0 66.78000000	66.78 + j 19.830	0.00 + j 0.000
C	2→0 0.00007500	0.00 - j 3075.458	0.00 + j 0.000
L	3→2 2.50000000	61.26 + j 37.271	61.26 + j 26.432
TL	1→3 50.00000000	61.26 + j 37.271	61.26 + j 37.271
L	2→0 106.00000000	0.00 + j 459.552	0.00 + j 0.000

WCAP PART		VSWR
TL	1→3 50.00000000	1.9932

WCAP INPUT DATA:
0.6900 0.00000000 0
R 66.78000000 2 0 19.83000000
C 0.00007500 2 0
L 2.50000000 3 2 0.00000000
TL 50.00000000 1 3 100.00000000 0.00100000 0.00000000
I **8.66000000 0 1 273.70000000**
L 106.00000000 2 0 0.00000000

WCAP Circuit Diagram



WCAP - KTSM T2 Night
WCAP OUTPUT AT FREQUENCY: 0.690 MHz

NODE VOLTAGES
Node: 1 284.9033 ∠ 67.2345° V
Node: 2 280.9826 ∠ 66.8957° V
Node: 3 284.9013 ∠ 67.2343° V

WCAP PART		CURRENT IN		CURRENT OUT	
TL	1→3	50.00000000	9.83 ∠ 0.175° A	9.83 ∠	0.175° A

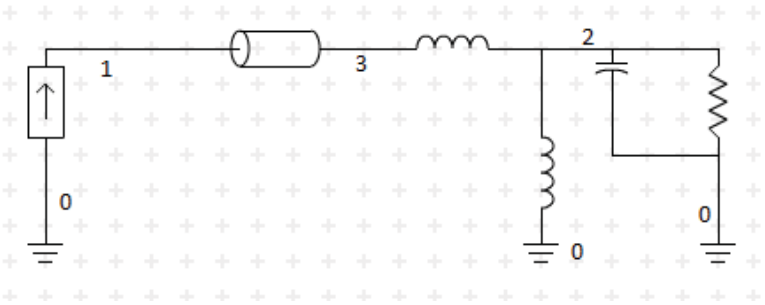
WCAP PART		BRANCH VOLTAGE		BRANCH CURRENT	
R	2→0	12.35000000	280.98 ∠ 66.896° V	**9.40 ∠**	**1.300° A**
C	2→0	0.00006000	280.98 ∠ 66.896° V	0.07 ∠	156.896° A
L	3→2	0.10000000	4.26 ∠ 90.175° V	9.83 ∠	0.175° A
L	2→0	120.00000000	280.98 ∠ 66.896° V	0.54 ∠	-23.104° A

WCAP PART		FROM IMPEDANCE		TO IMPEDANCE	
R	2→0	12.35000000	12.35 + j 27.220	0.00 + j	0.000
C	2→0	0.00006000	0.00 - j 3844.322	0.00 + j	0.000
L	3→2	0.10000000	11.30 + j 26.697	11.30 + j	26.264
TL	1→3	50.00000000	11.30 + j 26.698	11.30 + j	26.697
L	2→0	120.00000000	0.00 + j 520.248	0.00 + j	0.000

WCAP PART		VSWR
TL	1→3	50.00000000 5.7381

WCAP INPUT DATA:
0.6900 0.00000000 0
R 12.35000000 2 0 27.22000000
C 0.00006000 2 0
L 0.10000000 3 2 0.00000000
TL 50.00000000 1 3 100.00000000 0.00100000 0.00000000
I **9.82750000 0 1 0.17500000**
L 120.00000000 2 0 0.00000000

WCAP Circuit Diagram



WCAP - KTSM T3 Night
WCAP OUTPUT AT FREQUENCY: 0.690 MHz

NODE VOLTAGES
Node: 1 287.4082 ∠ 76.8499° V
Node: 2 120.3118 ∠ 57.1099° V
Node: 3 287.4062 ∠ 76.8498° V

WCAP PART		CURRENT IN	CURRENT OUT
TL	1→3 50.00000000	9.17 ∠ -0.017° A	9.17 ∠ -0.017° A

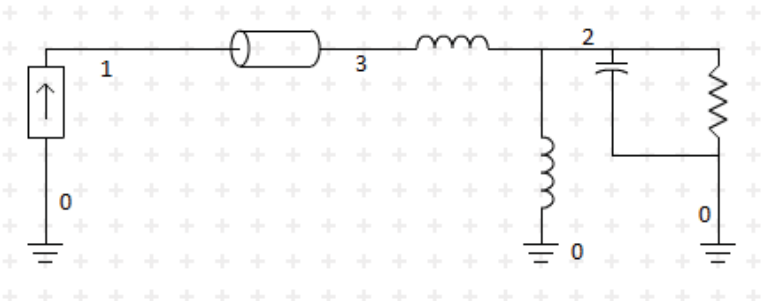
WCAP PART		BRANCH VOLTAGE	BRANCH CURRENT
R	2→0 7.44000000	120.31 ∠ 57.110° V	**8.97 ∠ 0.800° A**
C	2→0 0.00007500	120.31 ∠ 57.110° V	0.04 ∠ 147.110° A
L	3→2 4.50000000	178.84 ∠ 89.983° V	9.17 ∠ -0.017° A
L	2→0 101.00000000	120.31 ∠ 57.110° V	0.27 ∠ -32.890° A

WCAP PART		FROM IMPEDANCE	TO IMPEDANCE
R	2→0 7.44000000	7.44 + j 11.160	0.00 + j 0.000
C	2→0 0.00007500	0.00 - j 3075.458	0.00 + j 0.000
L	3→2 4.50000000	7.12 + j 30.532	7.12 + j 11.023
TL	1→3 50.00000000	7.12 + j 30.532	7.12 + j 30.532
L	2→0 101.00000000	-0.00 + j 437.875	0.00 + j 0.000

WCAP PART		VSWR
TL	1→3 50.00000000	9.6752

WCAP INPUT DATA:
0.6900 0.00000000 0
R 7.44000000 2 0 11.16000000
C 0.00007500 2 0
L 4.50000000 3 2 0.00000000
TL 50.00000000 1 3 100.00000000 0.00100000 0.00000000
I **9.16700000 0 1 -0.01700000**
L 101.00000000 2 0 0.00000000

WCAP Circuit Diagram



WCAP - KTSM T4 Night
WCAP OUTPUT AT FREQUENCY: 0.690 MHz

NODE VOLTAGES
Node: 1 579.6728 ∡ -53.8680° V
Node: 2 556.1777 ∡ -57.8677° V
Node: 3 579.6719 ∡ -53.8682° V

WCAP PART		CURRENT IN	CURRENT OUT
TL	1→3 50.00000000	7.59 ∡ -86.510° A	7.59 ∡ -86.510° A

WCAP PART		BRANCH VOLTAGE	BRANCH CURRENT
R	2→0 72.74000000	556.18 ∡ -57.868° V	**7.14 ∡ -78.900° A**
C	2→0 0.00007500	556.18 ∡ -57.868° V	0.18 ∡ 32.132° A
L	3→2 1.40000000	46.07 ∡ 3.490° V	7.59 ∡ -86.510° A
L	2→0 102.00000000	556.18 ∡ -57.868° V	1.26 ∡ -147.868° A

WCAP PART		FROM IMPEDANCE	TO IMPEDANCE
R	2→0 72.74000000	72.74 + j 27.970	0.00 + j 0.000
C	2→0 0.00007500	0.00 - j 3075.458	0.00 + j 0.000
L	3→2 1.40000000	64.31 + j 41.195	64.31 + j 35.125
TL	1→3 50.00000000	64.31 + j 41.195	64.31 + j 41.195
L	2→0 102.00000000	0.00 + j 442.211	0.00 + j 0.000

WCAP PART		VSWR
TL	1→3 50.00000000	2.1197

WCAP INPUT DATA:
0.6900 0.00000000 0
R 72.74000000 2 0 27.97000000
C 0.00007500 2 0
L 1.40000000 3 2 0.00000000
TL 50.00000000 1 3 100.00000000 0.00100000 0.00000000
I **7.59000000 0 1 273.49000000**
L 102.00000000 2 0 0.00000000

MEDIUM WAVE ARRAY SYNTHESIS FROM FIELD RATIOS

Frequency = .69 MHz

tower	field ratio magnitude	phase (deg)
1	1.	0
2	.85	-86.
3	.9	0
4	.765	-86.

VOLTAGES AND CURRENTS - rms

source node	voltage magnitude	phase (deg)	current magnitude	phase (deg)
1	281.169	66.9	9.40499	1.3
13	578.263	297.	8.30084	280.5
25	120.343	57.1	8.96997	.8
37	556.364	302.2	7.13902	281.1

Sum of square of source currents = 577.568
Total power = 10,000. watts

TOWER ADMITTANCE MATRIX

admittance	real (mhos)	imaginary (mhos)
Y(1, 1)	.00976602	-.00682763
Y(1, 2)	.00588552	.00656408
Y(1, 3)	.00506912	.00137237
Y(1, 4)	.00267754	.0013712
Y(2, 1)	.00588525	.00656433
Y(2, 2)	.0141781	-.0064903
Y(2, 3)	.00418596	.00242186
Y(2, 4)	.00506947	.00137333
Y(3, 1)	.00506902	.00137251
Y(3, 2)	.00418596	.00242186
Y(3, 3)	.0141782	-.00649093
Y(3, 4)	.00588528	.00656442
Y(4, 1)	.00267754	.0013712
Y(4, 2)	.00506957	.00137319
Y(4, 3)	.00588555	.00656416
Y(4, 4)	.00976621	-.00682713

TOWER IMPEDANCE MATRIX

impedance	real (ohms)	imaginary (ohms)
Z(1, 1)	49.1989	48.2835
Z(1, 2)	19.7786	-23.7388
Z(1, 3)	-12.4063	-13.3846
Z(1, 4)	-17.3907	-6.35582
Z(2, 1)	19.7774	-23.7396
Z(2, 2)	43.7889	31.0752
Z(2, 3)	-15.3739	-5.81966
Z(2, 4)	-12.4046	-13.3873
Z(3, 1)	-12.4066	-13.3844
Z(3, 2)	-15.3739	-5.81965
Z(3, 3)	43.7887	31.0749
Z(3, 4)	19.777	-23.7395
Z(4, 1)	-17.3907	-6.35582

Z(4, 2)	-12.4044	-13.3875
Z(4, 3)	19.7782	-23.7388
Z(4, 4)	49.1988	48.283

IMPEDANCE
normalization = 50.

freq (MHz)	resist (ohms)	react (ohms)	imped (ohms)	phase (deg)	VSWR	S11 dB	S12 dB
source = 1; node 1, sector 1							
.69	12.353	27.224	29.896	65.6	5.3063	-3.3134	-2.727
source = 2; node 13, sector 1							
.69	66.781	19.829	69.663	16.5	1.5618	-13.179	-.21406
source = 3; node 25, sector 1							
.69	7.4381	11.166	13.416	56.3	7.0646	-2.4756	-3.6202
source = 4; node 37, sector 1							
.69	72.743	27.965	77.933	21.	1.8024	-10.863	-.37149

CURRENT rms
Frequency = .69 MHz
Input power = 10,000. watts
Efficiency = 100. %
coordinates in degrees

current no.	X	Y	Z	mag (amps)	phase (deg)	real (amps)	imaginary (amps)
GND	0	0	0	9.40497	1.3	9.40261	.210896
2	0	0	7.91667	9.50339	.8	9.50245	.133925
3	0	0	15.8333	9.38747	.5	9.38712	.0807325
4	0	0	23.75	9.09431	.2	9.09424	.0368944
5	0	0	31.6667	8.63405	0.0	8.63405	8.11E-04
6	0	0	39.5833	8.01602	359.8	8.01597	-.0278231
7	0	0	47.5	7.25069	359.6	7.25053	-.048914
8	0	0	55.4167	6.34965	359.4	6.34934	-.062246
9	0	0	63.3333	5.3253	359.3	5.32487	-.0675867
10	0	0	71.25	4.18938	359.1	4.18888	-.0647195
11	0	0	79.1667	2.94984	359.	2.94936	-.0534024
12	0	0	87.0833	1.60079	358.8	1.60045	-.0331296
END	0	0	95.	0	0	0	0
GND	-93.9693	34.202	0	8.30086	280.5	1.51049	-8.16227
14	-93.9693	34.202	7.66667	8.35197	278.	1.15698	-8.27145

15	-93.9693	34.202	15.3333	8.23629	276.3	.907889	-8.1861
16	-93.9693	34.202	23.	7.97414	275.	.696044	-7.94371
17	-93.9693	34.202	30.6667	7.57094	273.9	.513302	-7.55352
18	-93.9693	34.202	38.3333	7.03282	272.9	.357311	-7.02374
19	-93.9693	34.202	46.	6.36727	272.	.227458	-6.3632
20	-93.9693	34.202	53.6667	5.58308	271.3	.123648	-5.58171
21	-93.9693	34.202	61.3333	4.68977	270.6	.0458709	-4.68954
22	-93.9693	34.202	69.	3.69638	269.9	-5.94E-03	-3.69638
23	-93.9693	34.202	76.6667	2.60857	269.3	-.0318745	-2.60837
24	-93.9693	34.202	84.3333	1.41968	268.7	-.0316341	-1.41933
END	-93.9693	34.202	92.	0	0	0	0
GND	-64.9838	-178.542	0	8.96998	.8	8.96915	.122187
26	-64.9838	-178.542	7.66667	8.96531	.5	8.96498	.077636
27	-64.9838	-178.542	15.3333	8.79441	.3	8.79428	.0469388
28	-64.9838	-178.542	23.	8.47357	.1	8.47354	.0216237
29	-64.9838	-178.542	30.6667	8.00947	0.0	8.00947	7.45E-04
30	-64.9838	-178.542	38.3333	7.40972	359.9	7.4097	-.0158815
31	-64.9838	-178.542	46.	6.68297	359.8	6.68291	-.0281976
32	-64.9838	-178.542	53.6667	5.8392	359.6	5.83909	-.0360619
33	-64.9838	-178.542	61.3333	4.88878	359.5	4.88862	-.0393131
34	-64.9838	-178.542	69.	3.84142	359.4	3.84124	-.0377889
35	-64.9838	-178.542	76.6667	2.70316	359.3	2.70298	-.0313025
36	-64.9838	-178.542	84.3333	1.46718	359.2	1.46705	-.0195034
END	-64.9838	-178.542	92.	0	0	0	0
GND	-158.95	-144.329	0	7.13902	281.1	1.37727	-7.00491
38	-158.95	-144.329	7.91667	7.22537	278.3	1.04687	-7.14913
39	-158.95	-144.329	15.8333	7.15279	276.5	.813759	-7.10635
40	-158.95	-144.329	23.75	6.94582	275.1	.616014	-6.91845
41	-158.95	-144.329	31.6667	6.60999	273.9	.446205	-6.59491
42	-158.95	-144.329	39.5833	6.15108	272.8	.302213	-6.14365
43	-158.95	-144.329	47.5	5.57612	271.9	.183485	-5.5731
44	-158.95	-144.329	55.4167	4.89339	271.1	.0898923	-4.89257
45	-158.95	-144.329	63.3333	4.112	270.3	.0213403	-4.11194
46	-158.95	-144.329	71.25	3.24075	269.6	-.0223567	-3.24068
47	-158.95	-144.329	79.1667	2.2857	269.	-.0414137	-2.28533
48	-158.95	-144.329	87.0833	1.2423	268.4	-.0356803	-1.24179
END	-158.95	-144.329	95.	0	0	0	0

Sampling System Measurements

The following calculations confirm that the sample system as installed complies with Rule Section 73.151(c)(2)(1) in all respects. The sample toroids are Delta model TCT1 and their outputs are in agreement within the manufacturer's specification of +/-2% and +/-2º. The antenna monitor is a Potomac Instruments model AM19(204). The antenna monitor was calibrated by the manufacturer on March 29, 2019 and is still within its calibration cycle. The sample lines are equal in length and constructed of 3/8" Phelps Dodge FX38-50 coaxial cable that has a solid outer conductor and foam dielectric. The cables are equal in length within 1º as required. The cables are all buried so as to be exposed to the same environmental conditions. The length of the cables was confirmed by measuring the impedance, looking into the line with the far end opened. The lines were found to be 1/4 wavelength long at the frequencies listed. These frequencies were used to calculate the electrical lengths of the lines at the operating frequency of 690 kHz. Frequencies were calculated at which the lines were +/- 45º the length of the resonate frequency. The impedance was then calculated using the following formula:

$$Zo = ((R1^2+X1^2)^{1/2} * (R2^2+X2^2)^{1/2})^{1/2}$$

Sample Line Length Calculation

Tower	Resonate Frequency At 90º, kHz	Electrical Length at 690 kHz, Degrees
1 (Southwest)	431.00	144.08
2 (Northwest)	430.30	144.32
3 (Northeast)	430.40	144.28
4 (Southeast)	430.50	144.25

Sample Line Impedance Calculation

Tower	90º Resonant Frequency kHz	45º Above Resonant Frequency kHz	Resistance Ohms	Reactance Ohms	45º Below Resonant Frequency kHz	Resistance Ohms	Reactance Ohms	Characteristic Impedance Ohms
1 (SW)	431.00	646.50	4.54	49.38	215.50	1.36	-49.09	49.35
2 (NW)	430.30	645.45	4.57	50.74	215.15	1.38	-50.22	50.59
3 (NE)	430.40	645.60	4.59	50.89	215.20	1.41	-50.25	50.68
4 (SE)	430.50	645.75	4.59	49.44	215.25	1.34	-48.71	49.19

The sample toroid calibration was confirmed by passing a common conductor through the toroids. The common conductor was driven by a Keysight P5020A vector network analyzer that was properly calibrated for response measurement. The output from the tower #1 toroid was fed to the reference receiver of the analyzer and the remaining toroids outputs were alternately fed to the B input, and the results noted in the chart below.

Sample Toroid Calibration Verification

Tower	Serial Number	Indicated Ratio	Indicated Phase
1 (SW)	911	1.0	0
2(NW)	5955A	1.003	0.135
3(NE)	5956	1.006	0.095
4 (SE)	15093	0.997	0.110

Sample Lines Terminated By Toroids

Tower	Serial Number	Impedance at Input to Sample Line with Toroid Connected
1 (SW)	911	47.91 – j0.31
2(NW)	5955A	48.47 – j1.2
3(NE)	5956	48.56 – j1.56
4 (SE)	15093	47.69 + j0.459

Direct Measurement of Power

The common point network in the nighttime phasor was adjusted to provide the proper operating resistance of 50 ohms and a reactance of 0 (zero) ohms to the transmitter output. The antenna operating powers were calculated to the nominal operating power of 10kW. The common point current was then calculated as indicated below.

Daytime directional mode power measurements are made at the common point via a toroidal current meter. Daytime operating impedance is 50 + j7, and nighttime operating impedance is 50 +j5.

Pattern	Nominal Power Watts	Operating Power Watts	Operating Common Point Current, Amps
Night	10000	10500	14.5
Day	10000	10500	14.5

Reference Field Strength Measurements

Reference field strength measurements were made on radials having existing monitor point limits on the current license as well as on radials in the main lobes as follows:

KTSM DA-U Day Pattern

Reference Field Strength Measurements

Point #	Distance /km	Field Strength mv/m	Location Description	GPS Coordinates NAD83
20-1	3.78	332	North side of State Line Dr. just past Argelia Dr.	32° 00' 06.2" N 106° 20' 27.4" W
20-2	4.87	197	In front of 213 Rebecca Dr.	32° 00' 39.4" N 106° 20' 13.5" W
20-3	7.13	7.13	North side of Luna Dr.	32° 01' 48.3" N 106° 19' 44.1" W
80-1	6.27	39.4	Fort Bliss - McGregor Range (restricted) West side of Route Green	31° 58' 46.6" N 106° 17' 21.1" W
80-2	10.4	21.3	Fort Bliss - McGregor Range (restricted) West side of Unnamed Road	31° 59' 09.8" N 106° 14' 45.1" W
80-3	14.4	13.8	Fort Bliss - McGregor Range (restricted) West side of Unnamed Road	31° 59' 32.4" N 106° 12' 15.7" W
128-1	4.66	140	Fort Bliss - McGregor Range (restricted) West side of Route Green	31° 56' 38.2" N 106° 18' 57.1" W
128-2	7.26	90.1	Fort Bliss - McGregor Range (restricted) North side of Unnamed Road	31° 55' 46.6" N 106° 17' 38.6" W
128-3	10.8	61.5	Fort Bliss - McGregor Range (restricted) West side of Unnamed Road	31° 54' 37.7" N 106° 15' 53.3" W
200-1	2.73	352	Parking area near end of Ashley Road	31° 56' 48.5" N 106° 21' 52.6" W
200-2	4.97	193	South edge of Andora Lopp Road	31° 55' 40.4" N 106° 22' 21.8" W

200-3	5.42	53	Corner of Oates Dr. and Railroad Rd. at fire hydrant	31° 55' 27.1" N 106° 22' 28.9" W
310-1	2.97	86.1	North side of Stan Roberts Sr. Ave.	31° 59' 13.0" N 106° 22' 43.2" W
310-2	6.96	37.8	East edge of Chaparral Drive	32° 00' 35.9" N 106° 24' 40.0" W
310-3	14.8	20	East side of Highway 213	32° 03' 19.5" N 106° 28' 28.8" W

KTSM DAN-U Night Pattern

Reference Field Strength Measurements

Point #	Distance /km	Field Strength mv/m	Location Description	GPS Coordinates NAD83
20-1	3.78	47	North side of State Line Dr. just past Argelia Dr.	32° 00' 06.2" N 106° 20' 27.4" W
20-2	4.87	27.8	In front of 213 Rebecca Dr.	32° 00' 39.4" N 106° 20' 13.5" W
20-3	7.13	25	North side of Luna Dr.	32° 01' 48.3" N 106° 19' 44.1" W
45-1	5.01	22.3	Fort Bliss - McGregor Range (restricted) South side of State Line Rd.	32° 00' 05.9" N 106° 19' 01.7" W
45-2	6.1	14	Fort Bliss - McGregor Range (restricted) North side of Myer Range Road	32° 00' 30.8" N 106° 18' 32.6" W
45-3	9.75	13.7	Fort Bliss - McGregor Range (restricted) West side of Route Green Tank Trail	32° 01' 54.0" N 106° 16' 53.5" W
65-1	7.95	19.2	Fort Bliss - McGregor Range (restricted) West side of Route Green	31° 59' 59.5" N 106° 16' 41.9" W
65-2	8.4	18	Fort Bliss - McGregor Range (restricted) South side of State Line Rd.	32° 00' 06.5" N 106° 16' 26.6" W
65-3	15.4	9.4	Fort Bliss - McGregor Range (restricted) South side of Route White South	32° 01' 41.6" N 106° 12' 24.9" W
90-1	5.49	6.82	Fort Bliss - McGregor Range (restricted) West side of Route Green	31° 58' 12.0" N 106° 17' 47.4" W

90-2	10.1	4.08	Fort Bliss - McGregor Range (restricted) West side of Unnamed Rd. at gas line marker	31° 58' 11.0" N 106° 14' 53.0" W
90-3	14.3	1.33	Fort Bliss - McGregor Range (restricted) West side of Unnamed Road	31° 58' 11.0" N 106° 12' 13.0" W
200-1	2.73	665	Parking area near end of Ashley Road	31° 56' 48.5" N 106° 21' 52.6" W
200-2	4.97	362	South edge of Andora Lopp Road	31° 55' 40.4" N 106° 22' 21.8" W
200-3	5.42	193	Corner of Oates Dr. and Railroad Rd. at fire hydrant	31° 55' 27.1" N 106° 22' 28.9" W
272-1	5.11	20.3	West side of McCombs St.	31° 58' 17.4" N 106° 24' 31.3" W
272-2	8.33	9.65	West side of Hwy 213 at Texas Farm 3255 sign	31° 58' 20.2" N 106° 26' 34.1" W
272-3	20.8	0.76	Southeast Corner of Camper Park off I-10	31° 58' 36.1" N 106° 34' 27.4" W
288-1	6.21	10.8	North side of Stan Roberts Sr. Ave.	31° 59' 12.6" N 106° 25' 02.2" W
288-2	8.83	10.3	West side of Hwy 213 at Caution Sign	31° 59' 40.0" N 106° 26' 36.5" W
288-3	15.8	3.53	South side of Hwy 404 at Caution Marker	32° 00' 48.2" N 106° 30' 48.1" W
310-1	2.97	9.78	North side of Stan Roberts Sr. Ave.	31° 59' 13.0" N 106° 22' 43.2" W
310-2	6.96	2.62	East edge of Chaparral Drive	32° 00' 35.9" N 106° 24' 40.0" W
310-3	14.8	3.01	East side of Highway 213	32° 03' 19.5" N 106° 28' 28.8" W

All measurements were taken October 19-20, 2021 with Potomac Instruments FIM-4100 field strength meter with serial number 133. The meter was calibrated by its manufacturer on June 2, 2021.

Item 8

RFR Compliance

Operation of KTSM at 10 kW daytime and nighttime will not result in exposure of workers or the general public to RF radiation in excess of levels specified in 47CFR 1.1310. Fences have been installed around all tower bases to comply with the minimum distance which exceeds the distances specified in OET Bulletin 65 for this frequency, calculated power levels in the towers and tower height to prevent electric and magnetic exposure greater than permissible levels. These fences limit access by the general public. If it becomes necessary for workers to enter the tower base areas for maintenance, the station will either reduce power or cease operation to provide RFR safety for the workers.

Item 9

Ground System Description

No changes were made to the ground system at KTSM and remains as previously licensed: Ground System consists of 240 radials 15.24 meters long about each tower, terminated at a circular buss, plus 120 equally spaced radials alternated and extending to 110 meters or point of overlap with radials bonded to transverse buss midway between adjacent towers. All buried.