ED

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2018 MAR 14 PM 2:36

March 13, 2018

FRANCISCO R. MONTERO
(703) 812-0480
MONTERO@FHHLAW.COM

ACCEPTED/FILED

MAR 13 2018

Federal Communications Commission
Office of the Secretary

VIA HAND DELIVERY
Ms. Marlene H. Dortch, Secretary
Federal Communications Commission
445 12th Street, SW
Washington, DC 20554

Attn: Audio Division, Media Bureau

Re: KZSF (AM), San Jose, CA (Facility ID No. 68841)
File No. BMML-20170322ABL
Amendment to Form 302-AM - Direct Measurement Application

Dear Ms. Dortch:

Transmitted herewith, in triplicate, on behalf of Carlos A. Duharte, the licensee of AM Station KZSF, San Jose, CA (Facility ID No. 68841), is an amendment to direct measurement application File No. BMML-20170322ABL on Form 302-AM. Licensee, through its counsel, initially submitted File No. BMML-20170322ABL to return to direct measurement of power using the method of moments model. By correspondence dated January 24, 2018, the Commission requested the application be amended to correct certain engineering deficiencies. A copy of this correspondence is attached for reference, as well as the response of technical consultant Bert Goldman.

Please contact the undersigned if any questions arise regarding this matter.

0009634924

Sincerely,

Mark DeSantis

Francisco R. Montero
Mark C. DeSantis
Counsel for Carlos A. Duharte

cc (via email): Edward Lubetzky

GOLDMAN
Engineering Management, LLC

March 7, 2018

Re: Amendment to KZSF File No.: BMML-20170322ABL

Dear Mr. Lubetzky

Attached, please find an amendment to the above referenced 302-AM application in response to your January 24th letter noting deficiencies.

All three items noted in the letter have been addressed. As a result of the corrections, the operating constants on the application form Section III, question 8 "Antenna indications for directional operation" have been modified. There are no other changes to the 302-AM form.

Also attached are the revised Method of Moments calculations as a result of the changes, and a new set of reference field readings which were taken following the changes being made to the parameters.

Thank you for your understanding on the time it took to implement these modifications.

Sincerely,

Bert Goldman
Goldman Engineering Mgmt.

560 Perkins Way, Auburn, CA 95603

FEDERAL COMMUNICATIONS COMMISSION
445 12th STREET SW
WASHINGTON DC 20554

MEDIA BUREAU
AUDIO DIVISION
APPLICATION STATUS: (202) 418-2730
HOME PAGE: www.fcc.gov/media/radio/audio-division

PROCESSING ENGINEER: Edward Lubetzky
TELEPHONE: (202) 418-2700
FACSIMILE: (202) 418-1410/11
MAIL STOP: 1800B2-EAL
INTERNET ADDRESS: Edward.Lubetzky@fcc.gov

JAN 2 4 2018

Carlos A. Duharte
2342 Bering Dr.
San Jose, California 95131

Re: Carlos A Duharte
KZSF(AM), San Jose, California
Facility ID Number: 68841
File Number: BMML-20170322ABL

Dear Applicant:

This is in reference to the above-captioned application to return to using direct measurement of power after the construction of KLOK(AM).

A preliminary engineering study reveals the following deficiencies:

1. The lumped series inductance of the feed system between the output port of each antenna tuning unit and the associated was not provided as required by Section 73.151(c)(1)(vii).

2. The proof was based on the incorrect theoretical parameters, in violation of Section 73.151(c)(2)(i) . See exhibit 4F-KZSF-Medium Wave Array Synthesis From Field Ratios.

3. The reference field strength measurements required under section 73.151(c)(3) were made using the wrong operating parameters.

Further action on the subject application will be withheld for thirty days from the date of this letter in order to provide you an opportunity to file a curative amendment. The amendment must be submitted in the same manner as the original application. Failure to respond or file an amendment within this time period will result in the dismissal of the application pursuant to Section 73.3568 of the rules.

Sincerely,

Son Nguyen
Supervisory Engineer
Audio Division
Media Bureau

cc: Bert Godman (via e-mail only)
Francisco R. Montero, Esq. (via e-mail only)

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. 20170322ABL

ACCEPTED/FILED
MAR 13 2018
Federal Communications Commission
Office of the Secretary

SECTION I - APPLICANT FEE INFORMATION

1. PAYOR NAME (Last, First, Middle Initial)
CARLOS A. DUHARTE

MAILING ADDRESS (Line 1) (Maximum 35 characters)
2343 BERING DR.

MAILING ADDRESS (Line 2) (Maximum 35 characters)

CITY	STATE OR COUNTRY (if foreign address)	ZIP CODE
SAN JOSE	CA	95131

TELEPHONE NUMBER (include area code)	CALL LETTERS	OTHER FCC IDENTIFIER (If applicable)
(408) 546-7201	KZSF	68841

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): DIRECT MEASUREMENT/MoM

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
	0001	$	

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
	0001	$	

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

SECTION II - APPLICANT INFORMATION		
1. NAME OF APPLICANT CARLOS A. DUHARTE		
MAILING ADDRESS 2343 Bering Dr		
CITY San Jose	STATE CA	ZIP CODE 95131

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
KZSF	SAN JOSE, CA	N/A	N/A	N/A

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

☐ Yes ☐ No

If No, explain in an Exhibit.

Exhibit No.

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

☐ Yes ☐ No

If No, state exceptions in an Exhibit.

Exhibit No.

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

☐ Yes ☐ No

If Yes, explain in an Exhibit.

Exhibit No.

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

☐ Yes ☐ No

☑ Does not apply

If No, explain in an Exhibit.

Exhibit No.

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

☐ Yes ☑ No

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

Exhibit No.

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

☐ Yes ☑ No

If Yes, provide particulars as an Exhibit.

Exhibit No.

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

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

CERTIFICATION

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

☑ Yes ☐ No

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

Name	Signature	
CARLOS DUHARTE		
Title	Date	Telephone Number
INDIVIDUAL	3/8/2018	(408) 546-7201

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
CARLOS DUHARTE

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
KZSF	N/A	1370	UNLIMITED	5.0	5.0

2. Station location	
State	City or Town
CALIFORNIA	SAN JOSE

3. Transmitter location			
State	County	City or Town	Street address (or other identification)
CA	SANTA CLARA	SAN JOSE	501 WOOSTER AVE

4. Main studio location			
State	County	City or Town	Street address (or other identification)
CA	SANTA CLARA	SAN JOSE	2343 Bering Dr San Jose, CA 95131

5. Remote control point location (specify only if authorized directional antenna)			
State	County	City or Town	Street address (or other identification)
CA	SANTA CLARA	SAN JOSE	2343 Bering Dr San Jose, CA 95131

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.
ENGR REPORT

8. Operating constants:	
RF common point or antenna current (in amperes) without modulation for night system 10.4	RF common point or antenna current (in amperes) without modulation for day system 10.4
Measured antenna or common point resistance (in ohms) at operating frequency Night 50.0 Day 50.0	Measured antenna or common point reactance (in ohms) at operating frequency Night +/ -J0 Day +/ -J0

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
1C	106.2	106.2	1.496	1.496	N/A	N/A
2E	177.0	177.0	0.555	0.555		
3N	27.9	27.9	0.408	0.408		
4W	0.0	0.0	1.0	1.0		

Manufacturer and type of antenna monitor: POTOMAC INSTRUMENTS AM-1901

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	59.4	60	60	Exhibit No. N/A

Excitation ☑ Series ☐ Shunt

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

North Latitude	West Longitude
37 ° 21 ' 28 "	121 ° 52 ' 17 "

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. A

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

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

NO CHANGE FROM EXISTING LICENSE

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

MODIFICATIONS TO SYSTEM ALLOWING ADDITION OF KLOK(AM) TO ARRAY

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)
BERT GOLDMAN	Herbert A Goldman
Address (include ZIP Code)	Date
560 PERKINS WAY AUBURN, CA 95603	3/7/2018
	Telephone No. (Include Area Code)
	(214) 395-5067

☐ Technical Director

☐ Registered Professional Engineer

☐ Chief Operator

☑ Technical Consultant

☐ Other (specify)

ENGINEERING AMENDMENT
KZSF, 1370 KHZ, DA-1
March, 2018

This Amendment is in response to the Commission's letter dated January 24, 2018, concerning the License Application for Radio Station KZSF. The data included in this amendment should supersede the original data submitted in BMML-20170322ABL.

1. Concerning the lumped series inductance of the feed system, a detailed breakdown is included that shows the network topology, along with the value series inductance used for each tower in the model. The inductance is lumped in series with the filter reactance at 1370 kHz. The total net series reactance is the value used in the model for directional computation and also used for impedance values to verify the model. These values are shown below. Also, during the review of the model, it was noticed that for tower open circuit calculations the lumped reactance at the base of the un-driven towers was that of the base insulator only. Measurements had been made with that configuration and also with the TCT jack open circuited. Revised impedance data and calculations are included with measured/modeled data, as shown below, at the TCT location for accuracy.

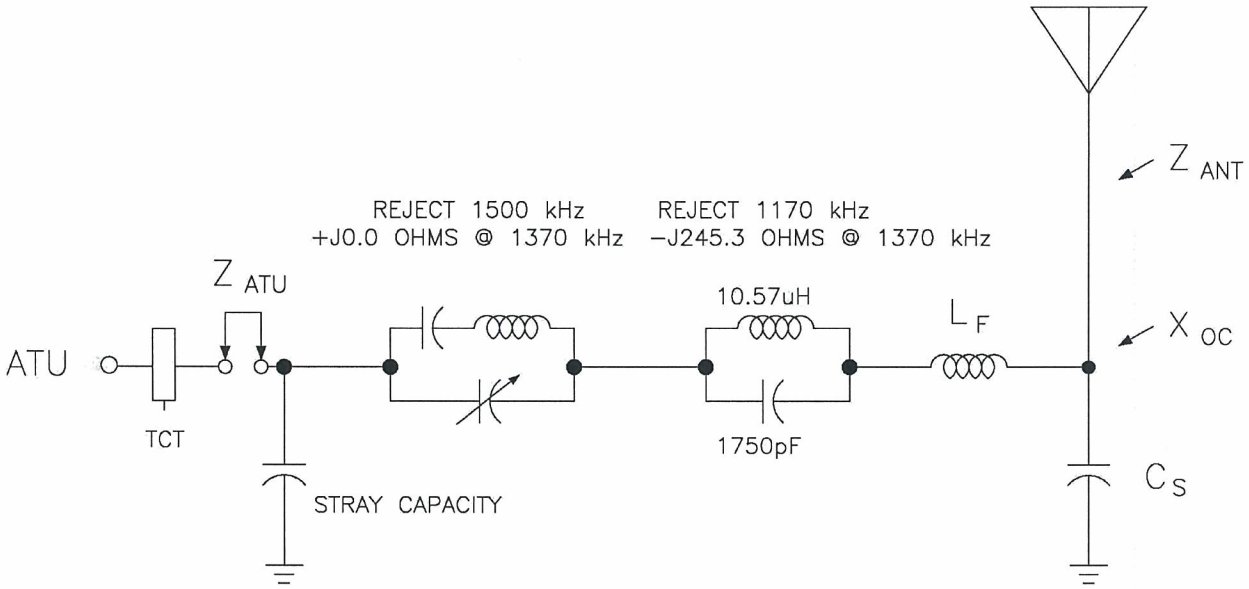
TOWER	MODELED Z(TCT) W/OTHERS OPEN	MEASURED Z(TCT) W/OTHERS OPEN
1	66.9 –j 85.2 Ω	66.0 –j 87.6 Ω
2	86.7 –j 99.6 Ω	88.1 –j 100.5 Ω
3	81.7 –j 83.3 Ω	82.2 –j 84.9 Ω
4	76.8 –j 98.8 Ω	79.9 –j 99.1 Ω

To confirm there was no excessive phase shift with the filter reactance in series, the TCT phase values with the measured net series reactance were compared to the series reactance set to a short circuit (J0.0 ohms) and agreed. These values are shown below.

	WITH ACTUAL SERIES REACTANCE	WITH SERIES REACTANCE J0
TOWER	PHASE(°)	PHASE(°)
1	106.2	106.3
2	177.0	176.8
3	27.9	27.5
4	0.0	0.0

2. Concerning the theoretical fields, original fields that were used had been changed, and this was not incorporated into the calculations. The current Fields for all towers have been run in the attached revised calculations. New parameters have been calculated.

KZSF, 1370 kHz, BASE CIRCUIT DESCRIPTION
METHOD OF MOMENTS MODEL



TOWER	Specified	Measured	Measured	Filter	Series Total	Stray C
	Cs (pf)	L_F (µH)	X_F (Ω)	Z_{SER} (Ω)	Z_{SERT} (Ω)	Z_{SHUNT} (Ω)
1	15	2.71	+j23.3	0.0 –j245.3	0.0 –j 222.0	0.0 –j 1000.0
2	15	0.85	+j7.3	0.0 –j 245.3	0.0 –j 238.0	0.0 –j 1500.0
3	15	3.52	+j30.3	0.0 –j 245.3	0.0 –j 215.0	0.0 –j 15000.0
4	15	2.24	+j19.3	0.0 –j 245.3	0.0 –j 226.0	0.0 –j 2200.0

DERIVED DIRECTIONAL PARAMETERS
EMPLOYING MOMENT METHOD MODELING
KZSF 1370 KHZ, DA-1

DA:

	Theoretical		Base Network Input Current		Normalized TCT	
Tower	**Field**	**Phase**	**Amplitude**	**Phase**	**Amplitude**	**Phase**
1 (C)	1.000	0.0°	6.12	+8.63°	1.496	+106.2°
2 (E)	.407	+71.4°	2.27	+79.46°	.555	+177.0°
3 (N)	.371	-92.6°	1.67	-69.60°	.408	+27.9°
4 (W)	.875	-119.0°	4.09	-97.53°	1.000	0.0°

MEDIUM WAVE ARRAY SYNTHESIS FROM FIELD RATIOS

Frequency = 1.37 MHz

tower	field ratio magnitude	phase (deg)
1	1.	0
2	.407	71.4
3	.371	-92.6
4	.875	-119.

VOLTAGES AND CURRENTS - rms

source node	voltage magnitude	phase (deg)	current magnitude	phase (deg)
1	609.239	69.4	5.5201	5.7
13	275.578	144.5	2.13991	77.2
25	457.799	326.2	1.7032	288.
37	960.893	304.	4.07422	257.

Sum of square of source currents = 109.102
Total power = 5,000. watts

TOWER ADMITTANCE MATRIX

admittance	real (mhos)	imaginary (mhos)
Y(1, 1)	.00302772	-.00329958
Y(1, 2)	.00205258	.000469636
Y(1, 3)	.00212037	.0020552
Y(1, 4)	.00206811	.00132657
Y(2, 1)	.00205257	.000469636
Y(2, 2)	.00423342	-.00425787
Y(2, 3)	.00183465	.000151668
Y(2, 4)	.000254092	-.000382143
Y(3, 1)	.00212035	.00205524
Y(3, 2)	.00183465	.000151698
Y(3, 3)	.00379834	-.00389264
Y(3, 4)	.00164596	.00042856
Y(4, 1)	.0020681	.0013266
Y(4, 2)	.000254089	-.000382138
Y(4, 3)	.00164596	.000428553
Y(4, 4)	.00379424	-.00424529

TOWER IMPEDANCE MATRIX

impedance	real (ohms)	imaginary (ohms)
Z(1, 1)	79.4405	131.05
Z(1, 2)	5.55771	-46.1193
Z(1, 3)	40.2237	-37.4782
Z(1, 4)	35.046	-44.6304
Z(2, 1)	5.55795	-46.1196
Z(2, 2)	95.949	134.634
Z(2, 3)	-4.67245	-45.72
Z(2, 4)	-40.737	-1.37609
Z(3, 1)	40.2229	-37.4786
Z(3, 2)	-4.67302	-45.7198
Z(3, 3)	82.6563	127.414
Z(3, 4)	4.74849	-50.3399
Z(4, 1)	35.0453	-44.6306
Z(4, 2)	-40.7368	-1.3758
Z(4, 3)	4.7486	-50.3399
Z(4, 4)	84.8697	124.323

KZSF

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

wire	caps	Distance	Angle	Z	radius	segs
1	none	0	0	0	.3	12
		0	0	110.		
2	none	123.3	61.	0	.32	12
		123.3	61.	110.5		
3	none	82.2	341.	0	.32	12
		82.2	341.	109.		
4	none	91.3	251.	0	.32	12
		91.3	251.	109.3		

Number of wires = 4
current nodes = 48

	minimum		maximum	
Individual wires	wire	value	wire	value
segment length	3	9.08333	2	9.20833
radius	1	.3	2	.32

ELECTRICAL DESCRIPTION
Frequencies (MHz)

	frequency		no. of	segment length (wavelengths)	
no.	lowest	step	steps	minimum	maximum
1	1.37	0	1	.0252315	.0255787

Sources

source	node	sector	magnitude	phase	type
1	1	1	861.594	69.4	voltage
2	13	1	389.726	144.5	voltage
3	25	1	647.426	326.2	voltage
4	37	1	1,358.91	304.	voltage

IMPEDANCE
normalization = 50.

freq (MHz)	resist (ohms)	react (ohms)	imped (ohms)	phase (deg)	VSWR	S11 dB	S12 dB
source = 1; node 1, sector 1							
1.37	48.905	98.941	110.37	63.7	5.8324	-3.0082	-3.0124
source = 2; node 13, sector 1							
1.37	49.833	118.75	128.78	67.2	7.5265	-2.3218	-3.8289
source = 3; node 25, sector 1							
1.37	211.13	166.34	268.79	38.2	6.9363	-2.522	-3.5605
source = 4; node 37, sector 1							
1.37	160.8	172.53	235.85	47.	7.0884	-2.4672	-3.6312

CURRENT rms
Frequency = 1.37 MHz
Input power = 5,000. watts
Efficiency = 100. %
coordinates in degrees

current no.	X	Y	Z	mag (amps)	phase (deg)	real (amps)	imaginary (amps)
GND	0	0	0	5.52011	5.7	5.49265	.549856
2	0	0	9.16667	6.00266	3.2	5.99305	.339445
3	0	0	18.3333	6.18335	1.9	6.18004	.202256
4	0	0	27.5	6.18582	.8	6.18516	.0901915
5	0	0	36.6667	6.02605	360.	6.02605	-1.2E-03
6	0	0	45.8333	5.71416	359.3	5.7137	-.0730145
7	0	0	55.	5.25987	358.6	5.25837	-.125284
8	0	0	64.1667	4.67405	358.1	4.67138	-.157759
9	0	0	73.3333	3.96876	357.5	3.96511	-.170159
10	0	0	82.5	3.15632	357.1	3.15214	-.16224
11	0	0	91.6667	2.24652	356.6	2.24253	-.133676
12	0	0	100.833	1.23886	356.1	1.23605	-.0834761
END	0	0	110.	0	0	0	0
GND	59.777	-107.841	0	2.13991	77.2	.473041	2.08697
14	59.777	-107.841	9.20833	2.37461	74.7	.627331	2.29024
15	59.777	-107.841	18.4167	2.47171	73.3	.709695	2.36763
16	59.777	-107.841	27.625	2.49183	72.3	.758387	2.37362
17	59.777	-107.841	36.8333	2.44239	71.4	.777471	2.31534
18	59.777	-107.841	46.0417	2.32783	70.7	.768675	2.19726
19	59.777	-107.841	55.25	2.15223	70.1	.733192	2.02349
20	59.777	-107.841	64.4583	1.92006	69.5	.672226	1.79854
21	59.777	-107.841	73.6667	1.63627	69.	.587103	1.52731
22	59.777	-107.841	82.875	1.30585	68.5	.479213	1.21475
23	59.777	-107.841	92.0833	.932774	68.	.349574	.864792
24	59.777	-107.841	101.292	.516683	67.5	.197579	.477414
END	59.777	-107.841	110.5	0	0	0	0
GND	77.7216	26.7617	0	1.7032	288.	.525461	-1.62012
26	77.7216	26.7617	9.08333	1.99696	277.8	.272134	-1.97833
27	77.7216	26.7617	18.1667	2.1594	273.	.112543	-2.15647
28	77.7216	26.7617	27.25	2.24588	269.7	-.0135879	-2.24584
29	77.7216	26.7617	36.3333	2.2597	267.2	-.111904	-2.25692
30	77.7216	26.7617	45.4167	2.20271	265.2	-.184158	-2.195
31	77.7216	26.7617	54.5	2.07712	263.6	-.231013	-2.06424
32	77.7216	26.7617	63.5833	1.88597	262.3	-.252997	-1.86892
33	77.7216	26.7617	72.6667	1.63308	261.2	-.250802	-1.61371
34	77.7216	26.7617	81.75	1.32265	260.2	-.225304	-1.30332
35	77.7216	26.7617	90.8333	.957938	259.3	-.177307	-.941386
36	77.7216	26.7617	99.9167	.537853	258.6	-.106736	-.527156
END	77.7216	26.7617	109.	0	0	0	0
GND	-29.7244	86.3258	0	4.07423	257.	-.919126	-3.96921
38	-29.7244	86.3258	9.10833	4.7713	249.2	-1.69192	-4.46125
39	-29.7244	86.3258	18.2167	5.13261	245.5	-2.12916	-4.67015
40	-29.7244	86.3258	27.325	5.30969	242.9	-2.42075	-4.72576
41	-29.7244	86.3258	36.4333	5.31592	240.9	-2.58638	-4.64432
42	-29.7244	86.3258	45.5417	5.15854	239.3	-2.63414	-4.4353
43	-29.7244	86.3258	54.65	4.84448	238.	-2.56919	-4.1071
44	-29.7244	86.3258	63.7583	4.38209	236.8	-2.39659	-3.66866
45	-29.7244	86.3258	72.8667	3.78125	235.9	-2.12199	-3.1297
46	-29.7244	86.3258	81.975	3.05243	235.	-1.75136	-2.50002
47	-29.7244	86.3258	91.0833	2.20384	234.2	-1.28937	-1.78731
48	-29.7244	86.3258	100.192	1.23358	233.5	-.734607	-.990997
END	-29.7244	86.3258	109.3	0	0	0	0

CUSTOMER : KZSF
NETWORK ID : TOWER 1DA REV

FREQUENCY : 1370.00 kHz
ATU SHUNT IMPEDANCE (R,X) : 0.00, -1000.00 OHMS
TOWER FEED IMPEDANCE (R,X) : 0.00, -222.00 OHMS
TOWER SHUNT IMPEDANCE (R,X) : 0.00, -7744.80 OHMS
TOWER IMPEDANCE (R,X) : 48.90, 98.94 OHMS

NODE	TO	NODE	IMPEDANCE (OHMS) R	X
1		GROUND	0.00	-1000.00
2		GROUND	50.18	99.90
1		2	0.00	-222.00

NODE	VOLTAGE MAGNITUDE	PHASE
1	719.40	-61.59
2	609.24	69.40

	REAL	IMAGINARY	MAGNITUDE	PHASE
INPUT IMPEDANCE (OHMS) :	39.77	-110.59	117.53	-70.22
INPUT CURRENT (AMPS) :	6.05	0.92	6.12	8.63
OUTPUT CURRENT (AMPS) :	5.49	0.55	5.52	5.70

INPUT/OUTPUT CURRENT RATIO = 1.1089
INPUT/OUTPUT PHASE = 2.93 DEGREES

CUSTOMER : KZSF
NETWORK ID : TOWER 2DA REV

FREQUENCY : 1370.00 kHz
ATU SHUNT IMPEDANCE (R,X) : 0.00, -1500.00 OHMS
TOWER FEED IMPEDANCE (R,X) : 0.00, -238.00 OHMS
TOWER SHUNT IMPEDANCE (R,X) : 0.00, -7744.80 OHMS
TOWER IMPEDANCE (R,X) : 49.83, 118.75 OHMS

NODE	TO	NODE	IMPEDANCE (OHMS) R	X
1		GROUND	0.00	-1500.00
2		GROUND	51.39	120.26
1		2	0.00	-238.00

NODE	VOLTAGE MAGNITUDE	PHASE
1	270.69	11.22
2	275.58	144.50

	REAL	IMAGINARY	MAGNITUDE	PHASE
INPUT IMPEDANCE (OHMS) :	44.14	-110.57	119.06	-68.24
INPUT CURRENT (AMPS) :	0.42	2.24	2.27	79.46
OUTPUT CURRENT (AMPS) :	0.47	2.09	2.14	77.27

INPUT/OUTPUT CURRENT RATIO = 1.0625
INPUT/OUTPUT PHASE = 2.19 DEGREES

CUSTOMER : KZSF
NETWORK ID : TOWER 3DA REV

FREQUENCY : 1370.00 kHz
ATU SHUNT IMPEDANCE (R,X) : 0.00,-15000.00 OHMS
TOWER FEED IMPEDANCE (R,X) : 0.00, -215.00 OHMS
TOWER SHUNT IMPEDANCE (R,X) : 0.00, -7744.80 OHMS
TOWER IMPEDANCE (R,X) : 211.13, 166.34 OHMS

NODE	TO NODE	IMPEDANCE (OHMS) R	X
1	GROUND	0.00	-15000.00
2	GROUND	220.33	163.85
1	2	0.00	-215.00

NODE	VOLTAGE MAGNITUDE	PHASE
1	377.12	-83.51
2	457.80	326.20

	REAL	IMAGINARY	MAGNITUDE	PHASE
INPUT IMPEDANCE (OHMS) :	218.79	-54.18	225.39	-13.91
INPUT CURRENT (AMPS) :	0.58	-1.57	1.67	-69.60
OUTPUT CURRENT (AMPS) :	0.53	-1.62	1.70	-72.03

INPUT/OUTPUT CURRENT RATIO = 0.9823
INPUT/OUTPUT PHASE = 2.43 DEGREES

CUSTOMER : KZSF
NETWORK ID : TOWER 4DA REV

FREQUENCY : 1370.00 kHz
ATU SHUNT IMPEDANCE (R,X) : 0.00, -2200.00 OHMS
TOWER FEED IMPEDANCE (R,X) : 0.00, -226.00 OHMS
TOWER SHUNT IMPEDANCE (R,X) : 0.00, -7744.80 OHMS
TOWER IMPEDANCE (R,X) : 160.80, 172.53 OHMS

NODE	TO NODE	IMPEDANCE (OHMS) R	X
1	GROUND	0.00	-2200.00
2	GROUND	168.14	172.89
1	2	0.00	-226.00

NODE	VOLTAGE MAGNITUDE	PHASE
1	702.54	-119.33
2	960.89	304.00

	REAL	IMAGINARY	MAGNITUDE	PHASE
INPUT IMPEDANCE (OHMS) :	159.41	-63.75	171.69	-21.80
INPUT CURRENT (AMPS) :	-0.54	-4.06	4.09	-97.53
OUTPUT CURRENT (AMPS) :	-0.92	-3.97	4.07	-103.02

INPUT/OUTPUT CURRENT RATIO = 1.0043
INPUT/OUTPUT PHASE = 5.48 DEGREES

CUSTOMER : KZSF
KZSF TOWER 1 REVISED

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

wire	caps	Distance	Angle	Z	radius	segs
1	none	0	0	0	.3	12
		0	0	110.		
2	none	123.3	61.	0	.32	12
		123.3	61.	110.5		
3	none	82.2	341.	0	.32	12
		82.2	341.	109.		
4	none	91.3	251.	0	.32	12
		91.3	251.	109.3		

Number of wires = 4
current nodes = 48

	minimum		maximum	
Individual wires	wire	value	wire	value
segment length	3	9.08333	2	9.20833
radius	1	.3	2	.32

ELECTRICAL DESCRIPTION
Frequencies (MHz)

	frequency		no. of	segment length (wavelengths)	
no.	lowest	step	steps	minimum	maximum
1	1.37	0	1	.0252315	.0255787

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	13	0	-1,419.5	0	0	0
2	25	0	-5,132.3	0	0	0
3	37	0	-1,847.3	0	0	0

IMPEDANCE
normalization = 50.

freq (MHz)	resist (ohms)	react (ohms)	imped (ohms)	phase (deg)	VSWR	S11 dB	S12 dB
source = 1; node 1, sector 1							
1.37	76.76	133.11	153.66	60.	6.6529	-2.6311	-3.4258

KZSF TOWER 2 REVISED

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

wire	caps	Distance	Angle	Z	radius	segs
1	none	0	0	0	.3	12
		0	0	110.		
2	none	123.3	61.	0	.32	12
		123.3	61.	110.5		
3	none	82.2	341.	0	.32	12
		82.2	341.	109.		
4	none	91.3	251.	0	.32	12
		91.3	251.	109.3		

Number of wires = 4
current nodes = 48

	minimum		maximum	
Individual wires	wire	value	wire	value
segment length	3	9.08333	2	9.20833
radius	1	.3	2	.32

ELECTRICAL DESCRIPTION
Frequencies (MHz)

	frequency		no. of	segment length (wavelengths)	
no.	lowest	step	steps	minimum	maximum
1	1.37	0	1	.0252315	.0255787

Sources

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

Lumped loads

load	node	resistance (ohms)	reactance (ohms)	inductance (mH)	capacitance (uF)	passive circuit
1	1	0	-1,055.5	0	0	0
2	25	0	-5,132.3	0	0	0
3	37	0	-1,847.3	0	0	0

IMPEDANCE
normalization = 50.

freq (MHz)	resist (ohms)	react (ohms)	imped (ohms)	phase (deg)	VSWR	S11 dB	S12 dB
source = 1; node 13, sector 1							
1.37	95.605	136.26	166.46	54.9	6.1568	-2.8468	-3.1802

KZSF TOWER 3 REVISED

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

wire	caps	Distance	Angle	Z	radius	segs
1	none	0	0	0	.3	12
		0	0	110.		
2	none	123.3	61.	0	.32	12
		123.3	61.	110.5		
3	none	82.2	341.	0	.32	12
		82.2	341.	109.		
4	none	91.3	251.	0	.32	12
		91.3	251.	109.3		

Number of wires = 4
current nodes = 48

	minimum		maximum	
Individual wires	wire	value	wire	value
segment length	3	9.08333	2	9.20833
radius	1	.3	2	.32

ELECTRICAL DESCRIPTION
Frequencies (MHz)

	frequency		no. of	segment length (wavelengths)	
no.	lowest	step	steps	minimum	maximum
1	1.37	0	1	.0252315	.0255787

Sources

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

Lumped loads

load	node	resistance (ohms)	reactance (ohms)	inductance (mH)	capacitance (uF)	passive circuit
1	1	0	-1,055.5	0	0	0
2	13	0	-1,419.5	0	0	0
3	37	0	-1,847.3	0	0	0

IMPEDANCE
normalization = 50.

freq (MHz)	resist (ohms)	react (ohms)	imped (ohms)	phase (deg)	VSWR	S11 dB	S12 dB
source = 1; node 25, sector 1							
1.37	79.87	130.35	152.87	58.5	6.3197	-2.7721	-3.2623

KZSF TOWER 4 REVISED

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

wire	caps	Distance	Angle	Z	radius	segs
1	none	0	0	0	.3	12
		0	0	110.		
2	none	123.3	61.	0	.32	12
		123.3	61.	110.5		
3	none	82.2	341.	0	.32	12
		82.2	341.	109.		
4	none	91.3	251.	0	.32	12
		91.3	251.	109.3		

Number of wires = 4
current nodes = 48

	minimum		maximum	
Individual wires	wire	value	wire	value
segment length	3	9.08333	2	9.20833
radius	1	.3	2	.32

ELECTRICAL DESCRIPTION
Frequencies (MHz)

	frequency		no. of	segment length (wavelengths)	
no.	lowest	step	steps	minimum	maximum
1	1.37	0	1	.0252315	.0255787

Sources

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

Lumped loads

load	node	resistance (ohms)	reactance (ohms)	inductance (mH)	capacitance (uF)	passive circuit
1	1	0	-1,055.5	0	0	0
2	13	0	-1,419.5	0	0	0
3	25	0	-5,132.3	0	0	0

IMPEDANCE
normalization = 50.

freq (MHz)	resist (ohms)	react (ohms)	imped (ohms)	phase (deg)	VSWR	S11 dB	S12 dB
source = 1; node 37, sector 1							
1.37	81.374	124.53	148.76	56.8	5.8835	-2.9816	-3.0392

CUSTOMER : KZSF
NETWORK ID : TOWER 1 REVISED

FREQUENCY : 1370.00 kHz
ATU SHUNT IMPEDANCE (R,X) : 0.00, -1000.00 OHMS
TOWER FEED IMPEDANCE (R,X) : 0.00, -222.00 OHMS
TOWER SHUNT IMPEDANCE (R,X) : 0.00, -7744.80 OHMS
TOWER IMPEDANCE (R,X) : 76.76, 133.11 OHMS

NODE	TO NODE	IMPEDANCE (OHMS) R	X
1	GROUND	0.00	-1000.00
2	GROUND	79.46	134.64
1	2	0.00	-222.00

NODE	VOLTAGE MAGNITUDE	PHASE
1	100.00	0.00
2	132.38	107.16

	REAL	IMAGINARY	MAGNITUDE	PHASE
INPUT IMPEDANCE (OHMS) :	66.85	-85.23	108.32	-51.89
INPUT CURRENT (AMPS) :	0.57	0.73	0.92	51.89
OUTPUT CURRENT (AMPS) :	0.59	0.63	0.86	47.13

INPUT/OUTPUT CURRENT RATIO = 1.0716
INPUT/OUTPUT PHASE = 4.76 DEGREES

CUSTOMER : KZSF
NETWORK ID : TOWER 2 REVISED

FREQUENCY : 1370.00 kHz
ATU SHUNT IMPEDANCE (R,X) : 0.00, -1500.00 OHMS
TOWER FEED IMPEDANCE (R,X) : 0.00, -238.00 OHMS
TOWER SHUNT IMPEDANCE (R,X) : 0.00, -7744.80 OHMS
TOWER IMPEDANCE (R,X) : 95.61, 136.26 OHMS

NODE	TO	NODE	IMPEDANCE (OHMS) R	X
1		GROUND	0.00	-1500.00
2		GROUND	99.04	137.46
1		2	0.00	-238.00

NODE	VOLTAGE MAGNITUDE	PHASE
1	100.00	0.00
2	120.04	99.66

	REAL	IMAGINARY	MAGNITUDE	PHASE
INPUT IMPEDANCE (OHMS) :	86.66	-99.59	132.02	-48.97
INPUT CURRENT (AMPS) :	0.50	0.57	0.76	48.97
OUTPUT CURRENT (AMPS) :	0.51	0.51	0.72	44.71

INPUT/OUTPUT CURRENT RATIO = 1.0503
INPUT/OUTPUT PHASE = 4.26 DEGREES

CUSTOMER : KZSF
NETWORK ID : TOWER 3 REVISED

FREQUENCY : 1370.00 kHz
ATU SHUNT IMPEDANCE (R,X) : 0.00,-15000.00 OHMS
TOWER FEED IMPEDANCE (R,X) : 0.00, -215.00 OHMS
TOWER SHUNT IMPEDANCE (R,X) : 0.00, -7744.80 OHMS
TOWER IMPEDANCE (R,X) : 79.87, 130.35 OHMS

NODE	TO NODE	IMPEDANCE (OHMS) R	X
1	GROUND	0.00	-15000.00
2	GROUND	82.62	131.71
1	2	0.00	-215.00

NODE	VOLTAGE MAGNITUDE	PHASE
1	100.00	0.00
2	132.54	103.13

	REAL	IMAGINARY	MAGNITUDE	PHASE
INPUT IMPEDANCE (OHMS) :	81.71	-83.27	116.66	-45.54
INPUT CURRENT (AMPS) :	0.60	0.61	0.86	45.54
OUTPUT CURRENT (AMPS) :	0.62	0.61	0.87	44.63

INPUT/OUTPUT CURRENT RATIO = 0.9887
INPUT/OUTPUT PHASE = 0.91 DEGREES

CUSTOMER : KZSF
NETWORK ID : TOWER 4 REVISED

FREQUENCY : 1370.00 kHz
ATU SHUNT IMPEDANCE (R,X) : 0.00, -2200.00 OHMS
TOWER FEED IMPEDANCE (R,X) : 0.00, -226.00 OHMS
TOWER SHUNT IMPEDANCE (R,X) : 0.00, -7744.80 OHMS
TOWER IMPEDANCE (R,X) : 81.37, 124.53 OHMS

NODE	TO	NODE	IMPEDANCE (OHMS) R	X
1		GROUND	0.00	-2200.00
2		GROUND	84.05	125.67
1		2	0.00	-226.00

NODE	VOLTAGE MAGNITUDE	PHASE
1	100.00	0.00
2	115.51	106.27

	REAL	IMAGINARY	MAGNITUDE	PHASE
INPUT IMPEDANCE (OHMS) :	76.77	-98.76	125.09	-52.14
INPUT CURRENT (AMPS) :	0.49	0.63	0.80	52.14
OUTPUT CURRENT (AMPS) :	0.50	0.59	0.78	49.44

INPUT/OUTPUT CURRENT RATIO = 1.0295
INPUT/OUTPUT PHASE = 2.70 DEGREES

Reference Field Strength Measurements- KZSF-

REVISED 3/1/2018

Reference field strength measurements were made using a Potomac Instruments FIM-41 which was compared in calibration to a Potomac Instruments PI4100 Serial Number 249, calibrated 1/21/2016 at three locations along radials at the azimuths as determined by pattern minima and lobes coinciding with the previous MoM proof on 2013.

The measured field strengths, descriptions, and GPS coordinates for the reference measurement points are shown on the following pages. All locations indicated are listed using NAD 83 datum. All measurements were taken on March 1st, 2018 between the hours of 9:00am and 3:30pm.

KZSF DA REFERENCE POINTS

48.5° Radial

Point No	Dist. Km.	N Latitude	W. Longitude	Field mV/m	Comments
1	1.06	37° 21' 50.4"	121° 51' 48.5"	126	Near Life Storage sign on Las Plumas
2	1.24	37° 21' 54.2"	121° 51' 42.7"	170	SE Corner pkg lot Freeland Foods
3	1.54	37° 22' 00.5"	121° 51' 33.8"	117	1985 Las Plumas

112° Radial

Point No	Dist. Km.	N. Latitude	W. Longitude	Field mV/m	Comments
1	0.93	37° 21' 16.3"	121° 51' 45.9"	390	NW Corner E St James & N 33rd st
2	1.16	37° 21' 13.5"	121° 51' 37.0"	295	Eastwood Ct
3	1.39	37° 22' 10.4"	121° 51' 28.8"	210	#45 34th St.

143.5° Radial

Point No	Dist. Km.	N. Latitude	W. Longitude	Field mV/m	Comments
1	0.26	37° 21' 20.9"	121° 52' 14.4"	150	SE Corner Eggo Pkg lot (pt toward array)
2	0.873	37° 21' 05.5"	121° 51' 59.8"	90	NE Corner SJ City parking lot
3	1.09	37° 20' 59.3"	121° 51' 54.6"	100	Five Wounds & N 28th St

281.5° Radial

Point No	Dist. Km.	N. Latitude	W. Longitude	Field mV/m	Comments
1	0.861	37° 21' 33.1"	121° 52' 55.2"	1100	743 N 20th St
2	1.06	37° 21' 34.9"	121° 53' 03.6"	1050	E Mission just West of 19th St.
3	1.27	37° 21' 36.1"	121° 53' 11.3"	800	Vestal & N 17th St