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July 9, 2019

Marlene H. Dortch, Esq.
Secretary
Federal Communications Commission
445 12th Street, SW
Washington, DC 20554

Attention: Media Bureau

Re: **Application for Moment Method License on FCC Form 302-AM and Request for Program Test Authority**
Multicultural Radio Broadcasting License, LLC
Station KIQI(AM), San Francisco, California
Facility Identifier Number 50703

Dear Ms. Dortch:

Transmitted herewith on behalf of Multicultural Radio Broadcasting Licensee, LLC ("MRBL"), the licensee of Station KIQI(AM) identified above, are an original and two copies of its application for license to cover BMP-20181207AAR. This modified permit increases the Station's nighttime power to 10 kW employing a revised directional antenna radiation pattern for the new nighttime operation. This Form 302-AM specifies new nighttime directional antenna parameters based on a Method of Moments proof-of-performance.

Further, while preparing this application it was determined that the geographic coordinates for the underlying construction permit are incorrect. This application uses the correct NAD-27 coordinates. MRBL respectfully requests a waiver of the Media Bureau's coordinate correction policy to allow this application to resolve the discrepancy in coordinates.

The associated filing fees totaling $1,560.00 were paid using FCC Fee Filer and proof of payment is included as part of this submission.

If there are any questions about his Application, please contact undersigned counsel for Multicultural Radio Broadcasting Licensee, LLC.

Sincerely,

Mark Lipp

Enclosures

cc: Mr. Jerome Manarchuck, Audio Division, Media Bureau, FCC

Federal Communications Commission
Washington, D. C. 20554

Approved by OMB
3060-0627
Expires 01/31/98

FOR FCC USE ONLY

Accepted / Filed

JUL - 9 2019

Federal Communications Commission
Office of the Secretary

FCC 302-AM
APPLICATION FOR AM BROADCAST STATION LICENSE

(Please read instructions before filling out form.

FOR COMMISSION USE ONLY
FILE NO. BMML-20190709AAO

SECTION I - APPLICANT FEE INFORMATION

1. PAYOR NAME (Last, First, Middle Initial)

Multicultural Radio Broadcasting License, LLC

MAILING ADDRESS (Line 1) (Maximum 35 characters)
40 Exchange Place, Suite 1010

MAILING ADDRESS (Line 2) (Maximum 35 characters)

CITY	STATE OR COUNTRY (if foreign address)	ZIP CODE
New York	New York	10005

TELEPHONE NUMBER (include area code)	CALL LETTERS	OTHER FCC IDENTIFIER (If applicable)
212.431.4300	KIQI(AM)	50703

2. A. Is a fee submitted with this application? ☑ Yes ☐ No

B. If No, indicate reason for fee exemption (see 47 C.F.R. Section

☐ Governmental Entity ☐ Noncommercial educational licensee ☐ Other (Please explain):

C. If Yes, provide the following information:

Enter in Column (A) the correct Fee Type Code for the service you are applying for. Fee Type Codes may be found in the "Mass Media Services Fee Filing Guide." Column (B) lists the Fee Multiple applicable for this application. Enter fee amount due in Column (C).

(A) FEE TYPE CODE	(B) FEE MULTIPLE	(C) FEE DUE FOR FEE TYPE CODE IN COLUMN (A)	FOR FCC USE ONLY
MMR	0001	$ 725.00	

To be used only when you are requesting concurrent actions which result in a requirement to list more than one Fee Type Code.

(A)	(B)	(C)	FOR FCC USE ONLY
MOR	0001	$ 835.00	

	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.	$ 1560.00	

SECTION II - APPLICANT INFORMATION		
1. NAME OF APPLICANT Multicultural Radio Broadcasting License, LLC		
MAILING ADDRESS 40 Exchange Place, Suite 1010		
CITY New York	STATE New York	ZIP CODE 10005

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
KIQI(AM)	San Francisco, CA	BP-20140214ABF	BMP-20181207AAR	09/14/2019

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. A

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	
Arthur S. Liu		
Title	Date	Telephone Number
President	07/05/2019	212.431.4300

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.

Application for License and MoM Proof-of-Performance
Multicultural Radio Broadcasting Licensee, LLC
Station KIQI(AM), San Francisco, CA

Exhibit A

Multicultural Radio Broadcasting Licensee, LLC, is not operating Station KIQI(AM) pursuant to automatic Program Test Authority because its nighttime operation, which this application covers, employs a revised directional antenna radiation pattern.

HATFIELD & DAWSON
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9500 GREENWOOD AVE. N.
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MAURY L. HATFIELD, PE
(1942-2009)
PAUL W. LEONARD, PE
(1925-2011)

Application for Station License
and
Method of Moments Proof of Performance
per BMP-20181207AAR

KIQI(AM)
San Francisco, CA
Facility ID 50703

1010 kHz
10 kW DA-2

Multicultural Radio Broadcasting Licensee

June 2019

APPLICATION FOR LICENSE

RADIO STATION KIQI(AM) San Francisco, CA

1010 kHz, DA-2

Purpose of Application

Item 1	Analysis of Tower Impedance Measurements to Verify Method of Moments Model
Item 2	Method of Moments Model Details for Towers Driven Individually
Item 3	Method of Moments Model Details for Directional Antenna Patterns
Item 4	Derivation of Operating Parameters for Directional Antenna
Item 5	Post Construction Array Geometry Statement
Item 6	Sampling System Measurements
Item 7	Reference Field Strength Measurements
Item 8	Direct Measurement of Power
Appendix A	Construction Permit BMP-20181207AAR
Appendix B	FCC Form 302-AM

Purpose of Application

This engineering exhibit supports an application by Multiculrtural Radio Broadcasting Licensee, LLC for a modified station license for radio station KIQI(AM) San Francisco, CA (Facility ID 50703). KIQI operates unlimited time on 1010 kHz with a power of 10 kW day and 0.5 kW night using a single directional antenna pattern for both day and night operation, as authorized by BZ-20020411ABB. This application for license is pursuant to the facility improvement authorized by BMP-20181207AAR, for increased nighttime power to 10 kW employing a revised directional antenna radiation pattern for the new nighttime operation. No changes have been made to the licensed daytime operation.

Information is provided herein demonstrating that the directional antenna parameters for the pattern authorized by the construction permit have been determined in accordance with the requirements of section §73.151(c) of the FCC Rules. The system has been adjusted to produce antenna monitor parameters within +/- 5 percent in ratio and +/- 3 degrees in phase of the modeled values, as required by the Rules.

All measurements contained in this report were made by the undersigned engineer and the Multicultural regional engineering director, Michael Gilbert, with the exception of the Reference Point field strength measurements which were taken by KIQI engineer Arthur Lebermann.

Geographic Coordinates

During the process of preparation of this license application it was determined that the geographic coordinates for the underlying construction permit, as originally filed and as amended, are incorrect. The coordinates shown in the current station license, BZ-20020411ABB as renewed by BR-20130731ATC, NL 37° 49' 34" by WL 122° 18' 37", are the correct NAD-27 coordinates, as confirmed by GPS measurement of the center tower location at the time of the reference point measurements.

For unknown reasons, the coordinates given in the original application for construction permit BP-20140214ABF are the NAD-83 coordinates, NL 37° 49' 34" by WL 122° 18' 41", and therefore those were used in the current amended nighttime power increase application, BMP-20181207AAR. (These coordinates are the NAD-83 coordinates shown in the Antenna Registration data for the center tower in the array, 1056742.)

This license application uses the correct NAD-27 coordinates. The staff will normally allow coordinate correction up to three seconds, but this correction is four seconds, so waiver of the policy is respectfully requested. The applicant requests Program Test Authority, and if such waiver cannot be granted, will promptly file a pro forma application for modification of the construction permit to the correct NAD-27 coordinates.

Item 1

Analysis of Tower Impedance Measurements to Verify Method of Moments Model - KIQI

Tower base impedance measurements were made at the locations of the sample system current transformers using a Hewlett Packard 8751A network analyzer in a calibrated measurement system. The other towers were open circuited at the same point where impedance measurements were made (the "reference points") for each of the measurements. The reference point measurements are listed in the table below.

KIQI Measured "Reference Point" Impedances

Tower	Measured R	Measured X
1 (E)	26.6	- J 12.3
2 (C)	25.2	-J 17.6
3 (W)	26.6	-J 16.8

Circuit calculations were performed to relate the method of moments modeled impedances at the tower base feed points to those at the measurement locations as shown in the diagram titled *Analysis of Tower Impedance Measurements to Verify Method of Moments Model*. The series/parallel equivalent impedance of $X_{LC,}$ X_L and X_{OC} was used in the moment method model as a load at ground level (lumped load) for the open circuited towers.

Item 2

Method of Moments Model Details for Towers Driven Individually - KIQI

The array of towers was modeled using Expert MININEC Broadcast Professional Version 14.0. One wire was used to represent each tower. The top and bottom wire end points were specified using electrical degrees in the geographic coordinate system, using the theoretical directional antenna specifications for tower spacing and orientation. Each tower was modeled as shown in the table and description below.

Each tower's modeled height relative to its physical height falls within the required range of 75 to 125 percent of the actual tower height.

KIQI Tower Dimensions - Physical and Modeled

Tower	Physical Height (Degrees)	Modeled Height (degrees)	Modeled Height (percent)	Modeled Radius (meters)	Modeled Radius (percent)
1E	75.4 + TL	82.5 + TL	109.4	See Table	100
2C	75.4 + TL	82.5 + TL	109.4	See Table	100
3W	75.4 + TL	82.5 + TL	109.4	See Table	100

KIQI MININEC Model Node and Wire Numbering

Tower	Wire Number	Base Node Number
1E	1	1
2C	41	45
3W	81	89

(The base wire and node numbers differ because of the nodes in the toploading model.)

Tower 3 has an STL antenna and a capacitive isocoupler. The impedance of the isoucoupler was found to be in excess of -j30k and therefore deemed to have no significant effect on the model or measured impedances.

The ground system matches the specifications listed on the previous license application.

The Moment Method Model for the KIQI Antenna Towers

The KIQI antenna system employs three identical Magnum self-supporting towers equipped with a top-loading assembly.

The effective electrical height of the towers and toploading was established in an exhibit to the license application BZ-20020411ABB and no changes have occurred subsequently.

The moment method model used in the present application for the facilities described in BMP-20181207AAR is based on the model developed by Ron Rackley for the implementation of the facilities described in the 2002 application, with the modification of the toploading model to meet the requirements of the current 73.151(c) rule.

The antenna towers are 204 feet, 62.2 meters, 75.4 degrees tall, with the addition of the measured value of 14.6 degrees of toploading.

The moment method model is a "Michelin Man" or "wedding cake" model for the tower itself, with the toploading radial wires and support members individually modeled, and with the tower height adjusted (for the "speed of light in steel" effect) to 68 meters, 109.4% of the actual physical height.

Tower Model Geometry

Height Meters	Lower Face inches	Upper Face inches	Average Radius M	Model Radius M	Percentage
0-17	171	90.8	1.59	1.56	98.1
17-34	90.8	58.5	0.905	0.91	100.5
34-51	58.5	24	0.5	0.4	80.0
51-68	24	24	0.291	0.26	89.3

The towers are physically 75.4 degrees tall, and each of the four tower sections has two segments and therefore the model meets the requirement that there be at least one segment for each 10 degrees of physical height.

The tower toploading consists of 6 horizontal support members and 30 intermediate wires, resulting in a radial element each 10 degrees.

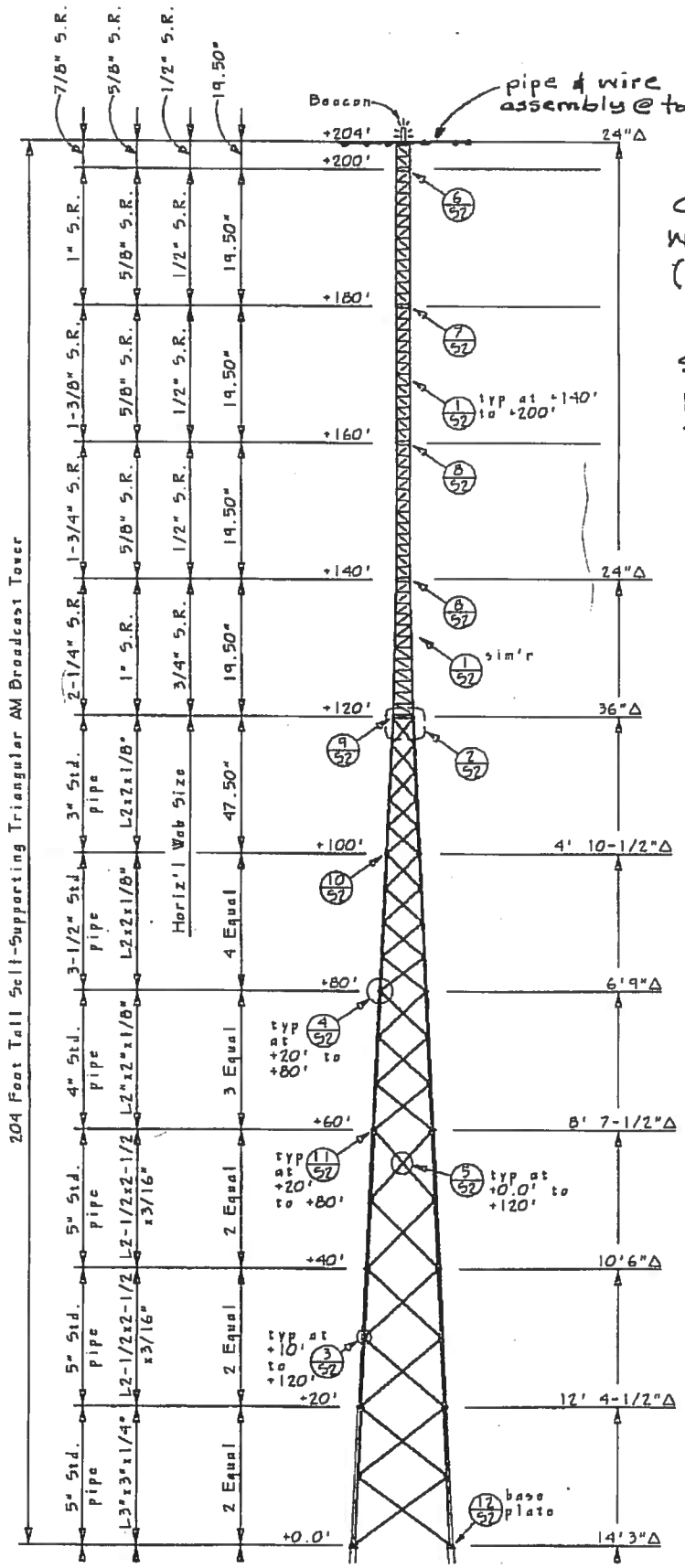
The support members are 2.13 meters (7 feet) in length, and the intermediate wires are all shorter, with the shortest intermediate wires, midway between the support member, at 1.84 meters in length. The toploading is therefore a hexagon. For simplicity it has been modeled as a disc of constant 2 meter radius, and the length adjustments are consistent with the Commission's moment method modeling limitations as shown in the table below. The support members are 2 inches square and the radial wires are #6 AWG copperweld wire. The perimeter wire has been ignored since no current flows in it. (Similarly to the lack of consideration of horizontal members when a cylindrical wire model is used.)

Toploading Model Details

Support	Length M	Model L	Percent	Radius M	Model R	Percent
Support	2.13	2.0	106.5	0.032	0.025	83.0%
Shortest Wire	1.84	2.0	92.0	0.00206	0.003	145.6%

Note that the moment method model geometry has the antenna elements located on a 0-180 degree line rather than the actual 60-240 degree alignment, for computational convenience. This, of course, has no effect on the current and impedance calculation results since they relate only to the spacing and tower structure geometry of this bilaterally symmetrical linear array.

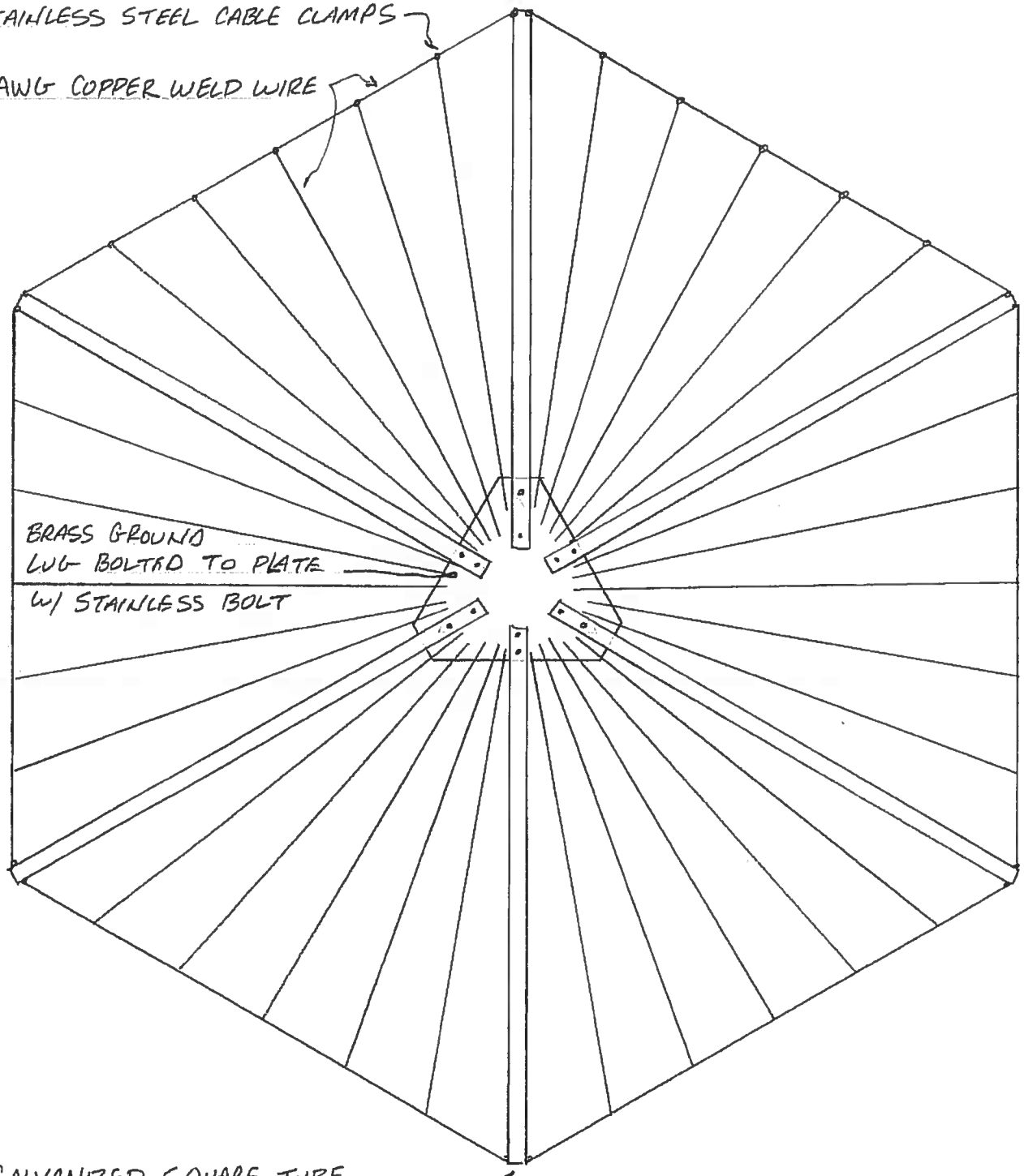
JOB	3 each 204 Foot Tall Triangular Self-Supporting AM Communication Towers KIQI AM Radio Oakland, California	JOB	1501-99	**MAGNUM TOWERS, INC.** **9370 ELDER CREEK ROAD** **SACRAMENTO, CA 95829** **(916) 381-5053**
CLIENT:	KIQI-AM - Bob Turner	DATE	Monday, January 25, 1999	PAGE 1 of 31



Code: EIA 222 F
Wind: 80 MPH basic
(Exposure 'C' implicit)

Seismic:
1997 UBC
Zone 4

JOB		JOB NO	MAGNUM TOWERS INC
CLIENT			9370 ELDER CREEK ROAD SACRAMENTO CALIFORNIA 95829
DRAWN BY	DATE	OWN. NO. PAGE OF	(916) 381-5053



KIQI Tower 1 Driven, Other Towers Open Circuited at Current Transformer Location

C:\Muticultural Stations\KIQI Mininec Files\MININEC Files\kiqi05A3eastalone

KIQI CP Pattern at 10 kW

GEOMETRY
Dimensions in meters
Environment: perfect ground

wire	caps	Distance	Angle	Z	radius	segs
1	none	0	0	0	1.56	2
		0	0	17.		
2	none	0	0	17.	.91	2
		0	0	34.		
3	none	0	0	34.	.4	2
		0	0	51.		
4	none	0	0	51.	.26	2
		0	0	68.		
5	none	0	0	68.	.025	1
		2.	0	68.		
6	none	0	0	68.	.025	1
		2.	-300.	68.		
7	none	0	0	68.	.025	1
		2.	-240.	68.		
8	none	0	0	68.	.025	1
		2.	-180.	68.		
9	none	0	0	68.	.025	1
		2.	-120.	68.		
10	none	0	0	68.	.025	1
		2.	-60.	68.		
11	none	0	0	68.	.003	1
		2.	-350.	68.		
12	none	0	0	68.	.003	1
		2.	-340.	68.		
13	none	0	0	68.	.003	1
		2.	-330.	68.		
14	none	0	0	68.	.003	1
		2.	-320.	68.		
15	none	0	0	68.	.003	1
		2.	-310.	68.		
16	none	0	0	68.	.003	1
		2.	-290.	68.		
17	none	0	0	68.	.003	1
		2.	-280.	68.		
18	none	0	0	68.	.003	1
		2.	-270.	68.		
19	none	0	0	68.	.003	1
		2.	-260.	68.		
20	none	0	0	68.	.003	1
		2.	-250.	68.		

21	none	0	0	68.	.003	1
		2.	-230.	68.		
22	none	0	0	68.	.003	1
		2.	-220.	68.		
23	none	0	0	68.	.003	1
		2.	-210.	68.		
24	none	0	0	68.	.003	1
		2.	-200.	68.		
25	none	0	0	68.	.003	1
		2.	-190.	68.		
26	none	0	0	68.	.003	1
		2.	-170.	68.		
27	none	0	0	68.	.003	1
		2.	-160.	68.		
28	none	0	0	68.	.003	1
		2.	-150.	68.		
29	none	0	0	68.	.003	1
		2.	-140.	68.		
30	none	0	0	68.	.003	1
		2.	-130.	68.		
31	none	0	0	68.	.003	1
		2.	-110.	68.		
32	none	0	0	68.	.003	1
		2.	-100.	68.		
33	none	0	0	68.	.003	1
		2.	-90.	68.		
34	none	0	0	68.	.003	1
		2.	-80.	68.		
35	none	0	0	68.	.003	1
		2.	-70.	68.		
36	none	0	0	68.	.003	1
		2.	-50.	68.		
37	none	0	0	68.	.003	1
		2.	-40.	68.		
38	none	0	0	68.	.003	1
		2.	-30.	68.		
39	none	0	0	68.	.003	1
		2.	-20.	68.		
40	none	0	0	68.	.003	1
		2.	-10.	68.		
41	none	74.206	0	0	1.56	2
		74.206	0	17.		
42	none	74.206	0	17.	.91	2
		74.206	0	34.		
43	none	74.206	0	34.	.4	2
		74.206	0	51.		
44	none	74.206	0	51.	.26	2
		74.206	0	68.		
45	none	74.206	0	68.	.025	1
		76.206	0	68.		
46	none	74.206	0	68.	.025	1
		75.2259	-358.681	68.		

47	none	74.206	0	68.	.025	1
		73.2265	-358.645	68.		
48	none	74.206	0	68.	.025	1
		72.206	0	68.		
49	none	74.206	0	68.	.025	1
		73.2265	-1.35536	68.		
50	none	74.206	0	68.	.025	1
		75.2259	-1.31933	68.		
51	none	74.206	0	68.	.003	1
		76.1764	-359.739	68.		
52	none	74.206	0	68.	.003	1
		76.0885	-359.485	68.		
53	none	74.206	0	68.	.003	1
		75.9446	-359.246	68.		
54	none	74.206	0	68.	.003	1
		75.749	-359.028	68.		
55	none	74.206	0	68.	.003	1
		75.5071	-358.837	68.		
56	none	74.206	0	68.	.003	1
		74.9136	-358.562	68.		
57	none	74.206	0	68.	.003	1
		74.5793	-358.487	68.		
58	none	74.206	0	68.	.003	1
		74.233	-358.456	68.		
59	none	74.206	0	68.	.003	1
		73.885	-358.472	68.		
60	none	74.206	0	68.	.003	1
		73.546	-358.536	68.		
61	none	74.206	0	68.	.003	1
		72.9365	-358.796	68.		
62	none	74.206	0	68.	.003	1
		72.6853	-358.987	68.		
63	none	74.206	0	68.	.003	1
		72.4809	-359.21	68.		
64	none	74.206	0	68.	.003	1
		72.3299	-359.458	68.		
65	none	74.206	0	68.	.003	1
		72.2372	-359.725	68.		
66	none	74.206	0	68.	.003	1
		72.2372	-.275463	68.		
67	none	74.206	0	68.	.003	1
		72.3299	-.541868	68.		
68	none	74.206	0	68.	.003	1
		72.4809	-.79052	68.		
69	none	74.206	0	68.	.003	1
		72.6853	-1.01344	68.		
70	none	74.206	0	68.	.003	1
		72.9365	-1.20363	68.		
71	none	74.206	0	68.	.003	1
		73.546	-1.46429	68.		
72	none	74.206	0	68.	.003	1
		73.885	-1.52756	68.		

73	none	74.206	0	68.	.003	1
		74.233	-1.54386	68.		
74	none	74.206	0	68.	.003	1
		74.5793	-1.51334	68.		
75	none	74.206	0	68.	.003	1
		74.9136	-1.43755	68.		
76	none	74.206	0	68.	.003	1
		75.5071	-1.16265	68.		
77	none	74.206	0	68.	.003	1
		75.749	-.972443	68.		
78	none	74.206	0	68.	.003	1
		75.9446	-.754463	68.		
79	none	74.206	0	68.	.003	1
		76.0885	-.5151	68.		
80	none	74.206	0	68.	.003	1
		76.1764	-.261219	68.		
81	none	148.412	0	0	1.56	2
		148.412	0	17.		
82	none	148.412	0	17.	.91	2
		148.412	0	34.		
83	none	148.412	0	34.	.4	2
		148.412	0	51.		
84	none	148.412	0	51.	.26	2
		148.412	0	68.		
85	none	148.412	0	68.	.025	1
		150.412	0	68.		
86	none	148.412	0	68.	.025	1
		149.422	-359.336	68.		
87	none	148.412	0	68.	.025	1
		147.422	-359.327	68.		
88	none	148.412	0	68.	.025	1
		146.412	0	68.		
89	none	148.412	0	68.	.025	1
		147.422	-.673179	68.		
90	none	148.412	0	68.	.025	1
		149.422	-.664169	68.		
91	none	148.412	0	68.	.003	1
		150.382	-359.868	68.		
92	none	148.412	0	68.	.003	1
		150.293	-359.739	68.		
93	none	148.412	0	68.	.003	1
		150.147	-359.618	68.		
94	none	148.412	0	68.	.003	1
		149.95	-359.509	68.		
95	none	148.412	0	68.	.003	1
		149.705	-359.414	68.		
96	none	148.412	0	68.	.003	1
		149.108	-359.278	68.		
97	none	148.412	0	68.	.003	1
		148.772	-359.241	68.		
98	none	148.412	0	68.	.003	1
		148.426	-359.228	68.		

99	none	148.412	0	68.	.003	1
		148.078	-359.238	68.		
100	none	148.412	0	68.	.003	1
		147.74	-359.271	68.		
101	none	148.412	0	68.	.003	1
		147.134	-359.403	68.		
102	none	148.412	0	68.	.003	1
		146.886	-359.499	68.		
103	none	148.412	0	68.	.003	1
		146.683	-359.609	68.		
104	none	148.412	0	68.	.003	1
		146.534	-359.733	68.		
105	none	148.412	0	68.	.003	1
		146.443	-359.864	68.		
106	none	148.412	0	68.	.003	1
		146.443	-.13588	68.		
107	none	148.412	0	68.	.003	1
		146.534	-.267465	68.		
108	none	148.412	0	68.	.003	1
		146.683	-.390612	68.		
109	none	148.412	0	68.	.003	1
		146.886	-.501472	68.		
110	none	148.412	0	68.	.003	1
		147.134	-.596623	68.		
111	none	148.412	0	68.	.003	1
		147.74	-.728874	68.		
112	none	148.412	0	68.	.003	1
		148.078	-.762126	68.		
113	none	148.412	0	68.	.003	1
		148.426	-.772071	68.		
114	none	148.412	0	68.	.003	1
		148.772	-.758568	68.		
115	none	148.412	0	68.	.003	1
		149.108	-.722186	68.		
116	none	148.412	0	68.	.003	1
		149.705	-.586377	68.		
117	none	148.412	0	68.	.003	1
		149.95	-.491225	68.		
118	none	148.412	0	68.	.003	1
		150.147	-.3816	68.		
119	none	148.412	0	68.	.003	1
		150.293	-.260776	68.		
120	none	148.412	0	68.	.003	1
		150.382	-.132321	68.		

Number of wires = 120
current nodes = 132

	minimum		maximum	
Individual wires	wire	value	wire	value
segment length	102	1.99886	1	8.5
segment/radius ratio	1	5.44872	97	667.007

radius 11 3.E-03 1 1.56

ELECTRICAL DESCRIPTION
Frequencies (MHz)

no.	frequency lowest	step	no. of steps	segment length (wavelengths) minimum	maximum
1	1.01	0	1	6.73E-03	.0286358

Sources

source	node	sector	magnitude	phase	type
1	1	1	100.	0	voltage

Lumped loads

load	node	resistance (ohms)	reactance (ohms)	inductance (mH)	capacitance (uF)	passive circuit
1	45	0	108,500.	0	0	0
2	89	0	108,500.	0	0	0

C:\Muticultural Stations\KIQI Mininec Files\MININEC Files\kiqi05A3eastalone

IMPEDANCE
normalization = 50.

freq (MHz)	resist (ohms)	react (ohms)	imped (ohms)	phase (deg)	VSWR	S11 dB	S12 dB
source = 1; node 1, sector 1							
1.01	26.866	-33.552	42.983	308.7	2.8904	-6.2687	-1.1697

KIQI Tower 2 Driven, Other Towers Open Circuited at Current Transformer Location

C:\Muticultural Stations\KIQI 1010 San Francisco\MININEC Files\kiqi05A3centeralone

KIQI CP Pattern at 10 kW

GEOMETRY
Dimensions in meters
Environment: perfect ground

wire	caps	Distance	Angle	Z	radius	segs
1	none	0	0	0	1.56	2
		0	0	17.		
2	none	0	0	17.	.91	2
		0	0	34.		
3	none	0	0	34.	.4	2
		0	0	51.		
4	none	0	0	51.	.26	2
		0	0	68.		
5	none	0	0	68.	.025	1
		2.	0	68.		
6	none	0	0	68.	.025	1
		2.	-300.	68.		
7	none	0	0	68.	.025	1
		2.	-240.	68.		
8	none	0	0	68.	.025	1
		2.	-180.	68.		
9	none	0	0	68.	.025	1
		2.	-120.	68.		
10	none	0	0	68.	.025	1
		2.	-60.	68.		
11	none	0	0	68.	.003	1
		2.	-350.	68.		
12	none	0	0	68.	.003	1
		2.	-340.	68.		
13	none	0	0	68.	.003	1
		2.	-330.	68.		
14	none	0	0	68.	.003	1
		2.	-320.	68.		
15	none	0	0	68.	.003	1
		2.	-310.	68.		
16	none	0	0	68.	.003	1
		2.	-290.	68.		
17	none	0	0	68.	.003	1
		2.	-280.	68.		
18	none	0	0	68.	.003	1
		2.	-270.	68.		
19	none	0	0	68.	.003	1
		2.	-260.	68.		
20	none	0	0	68.	.003	1

		2.	-250.	68.		
21	none	0	0	68.	.003	1
		2.	-230.	68.		
22	none	0	0	68.	.003	1
		2.	-220.	68.		
23	none	0	0	68.	.003	1
		2.	-210.	68.		
24	none	0	0	68.	.003	1
		2.	-200.	68.		
25	none	0	0	68.	.003	1
		2.	-190.	68.		
26	none	0	0	68.	.003	1
		2.	-170.	68.		
27	none	0	0	68.	.003	1
		2.	-160.	68.		
28	none	0	0	68.	.003	1
		2.	-150.	68.		
29	none	0	0	68.	.003	1
		2.	-140.	68.		
30	none	0	0	68.	.003	1
		2.	-130.	68.		
31	none	0	0	68.	.003	1
		2.	-110.	68.		
32	none	0	0	68.	.003	1
		2.	-100.	68.		
33	none	0	0	68.	.003	1
		2.	-90.	68.		
34	none	0	0	68.	.003	1
		2.	-80.	68.		
35	none	0	0	68.	.003	1
		2.	-70.	68.		
36	none	0	0	68.	.003	1
		2.	-50.	68.		
37	none	0	0	68.	.003	1
		2.	-40.	68.		
38	none	0	0	68.	.003	1
		2.	-30.	68.		
39	none	0	0	68.	.003	1
		2.	-20.	68.		
40	none	0	0	68.	.003	1
		2.	-10.	68.		
41	none	74.206	0	0	1.56	2
		74.206	0	17.		
42	none	74.206	0	17.	.91	2
		74.206	0	34.		
43	none	74.206	0	34.	.4	2
		74.206	0	51.		
44	none	74.206	0	51.	.26	2
		74.206	0	68.		
45	none	74.206	0	68.	.025	1
		76.206	0	68.		
46	none	74.206	0	68.	.025	1

		75.2259	-358.681	68.		
47	none	74.206	0	68.	.025	1
		73.2265	-358.645	68.		
48	none	74.206	0	68.	.025	1
		72.206	0	68.		
49	none	74.206	0	68.	.025	1
		73.2265	-1.35536	68.		
50	none	74.206	0	68.	.025	1
		75.2259	-1.31933	68.		
51	none	74.206	0	68.	.003	1
		76.1764	-359.739	68.		
52	none	74.206	0	68.	.003	1
		76.0885	-359.485	68.		
53	none	74.206	0	68.	.003	1
		75.9446	-359.246	68.		
54	none	74.206	0	68.	.003	1
		75.749	-359.028	68.		
55	none	74.206	0	68.	.003	1
		75.5071	-358.837	68.		
56	none	74.206	0	68.	.003	1
		74.9136	-358.562	68.		
57	none	74.206	0	68.	.003	1
		74.5793	-358.487	68.		
58	none	74.206	0	68.	.003	1
		74.233	-358.456	68.		
59	none	74.206	0	68.	.003	1
		73.885	-358.472	68.		
60	none	74.206	0	68.	.003	1
		73.546	-358.536	68.		
61	none	74.206	0	68.	.003	1
		72.9365	-358.796	68.		
62	none	74.206	0	68.	.003	1
		72.6853	-358.987	68.		
63	none	74.206	0	68.	.003	1
		72.4809	-359.21	68.		
64	none	74.206	0	68.	.003	1
		72.3299	-359.458	68.		
65	none	74.206	0	68.	.003	1
		72.2372	-359.725	68.		
66	none	74.206	0	68.	.003	1
		72.2372	-.275463	68.		
67	none	74.206	0	68.	.003	1
		72.3299	-.541868	68.		
68	none	74.206	0	68.	.003	1
		72.4809	-.79052	68.		
69	none	74.206	0	68.	.003	1
		72.6853	-1.01344	68.		
70	none	74.206	0	68.	.003	1
		72.9365	-1.20363	68.		
71	none	74.206	0	68.	.003	1
		73.546	-1.46429	68.		
72	none	74.206	0	68.	.003	1

		73.885	-1.52756	68.		
73	none	74.206	0	68.	.003	1
		74.233	-1.54386	68.		
74	none	74.206	0	68.	.003	1
		74.5793	-1.51334	68.		
75	none	74.206	0	68.	.003	1
		74.9136	-1.43755	68.		
76	none	74.206	0	68.	.003	1
		75.5071	-1.16265	68.		
77	none	74.206	0	68.	.003	1
		75.749	-.972443	68.		
78	none	74.206	0	68.	.003	1
		75.9446	-.754463	68.		
79	none	74.206	0	68.	.003	1
		76.0885	-.5151	68.		
80	none	74.206	0	68.	.003	1
		76.1764	-.261219	68.		
81	none	148.412	0	0	1.56	2
		148.412	0	17.		
82	none	148.412	0	17.	.91	2
		148.412	0	34.		
83	none	148.412	0	34.	.4	2
		148.412	0	51.		
84	none	148.412	0	51.	.26	2
		148.412	0	68.		
85	none	148.412	0	68.	.025	1
		150.412	0	68.		
86	none	148.412	0	68.	.025	1
		149.422	-359.336	68.		
87	none	148.412	0	68.	.025	1
		147.422	-359.327	68.		
88	none	148.412	0	68.	.025	1
		146.412	0	68.		
89	none	148.412	0	68.	.025	1
		147.422	-.673179	68.		
90	none	148.412	0	68.	.025	1
		149.422	-.664169	68.		
91	none	148.412	0	68.	.003	1
		150.382	-359.868	68.		
92	none	148.412	0	68.	.003	1
		150.293	-359.739	68.		
93	none	148.412	0	68.	.003	1
		150.147	-359.618	68.		
94	none	148.412	0	68.	.003	1
		149.95	-359.509	68.		
95	none	148.412	0	68.	.003	1
		149.705	-359.414	68.		
96	none	148.412	0	68.	.003	1
		149.108	-359.278	68.		
97	none	148.412	0	68.	.003	1
		148.772	-359.241	68.		
98	none	148.412	0	68.	.003	1

		148.426	-359.228	68.		
99	none	148.412	0	68.	.003	1
		148.078	-359.238	68.		
100	none	148.412	0	68.	.003	1
		147.74	-359.271	68.		
101	none	148.412	0	68.	.003	1
		147.134	-359.403	68.		
102	none	148.412	0	68.	.003	1
		146.886	-359.499	68.		
103	none	148.412	0	68.	.003	1
		146.683	-359.609	68.		
104	none	148.412	0	68.	.003	1
		146.534	-359.733	68.		
105	none	148.412	0	68.	.003	1
		146.443	-359.864	68.		
106	none	148.412	0	68.	.003	1
		146.443	-.13588	68.		
107	none	148.412	0	68.	.003	1
		146.534	-.267465	68.		
108	none	148.412	0	68.	.003	1
		146.683	-.390612	68.		
109	none	148.412	0	68.	.003	1
		146.886	-.501472	68.		
110	none	148.412	0	68.	.003	1
		147.134	-.596623	68.		
111	none	148.412	0	68.	.003	1
		147.74	-.728874	68.		
112	none	148.412	0	68.	.003	1
		148.078	-.762126	68.		
113	none	148.412	0	68.	.003	1
		148.426	-.772071	68.		
114	none	148.412	0	68.	.003	1
		148.772	-.758568	68.		
115	none	148.412	0	68.	.003	1
		149.108	-.722186	68.		
116	none	148.412	0	68.	.003	1
		149.705	-.586377	68.		
117	none	148.412	0	68.	.003	1
		149.95	-.491225	68.		
118	none	148.412	0	68.	.003	1
		150.147	-.3816	68.		
119	none	148.412	0	68.	.003	1
		150.293	-.260776	68.		
120	none	148.412	0	68.	.003	1
		150.382	-.132321	68.		

Number of wires = 120
current nodes = 132

	minimum		maximum	
Individual wires	wire	value	wire	value
segment length	102	1.99886	1	8.5

segment/radius ratio	1	5.44872		97	667.007
radius	11	3.E-03		1	1.56

ELECTRICAL DESCRIPTION

Frequencies (MHz)

no.	frequency lowest	step	no. of steps	segment length (wavelengths) minimum	maximum
1	1.01	0	1	6.73E-03	.0286358

Sources

source	node	sector	magnitude	phase	type
1	45	1	100.	0	voltage

Lumped loads

load	node	resistance (ohms)	reactance (ohms)	inductance (mH)	capacitance (uF)	passive circuit
1	89	0	108,500.	0	0	0
2	1	0	108,500.	0	0	0

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IMPEDANCE

normalization = 50.

freq (MHz)	resist (ohms)	react (ohms)	imped (ohms)	phase (deg)	VSWR	S11 dB	S12 dB
source = 1; node 45, sector 1							
1.01	25.23	-33.909	42.266	306.7	3.0724	-5.8676	-1.3016

KIQI Tower 3 Driven, Other Towers Open Circuited at Current Transformer Location

C:\Muticultural Stations\KIQI 1010 San Francisco\MININEC Files\kiqi05A3westalone

KIQI CP Pattern at 10 kW

GEOMETRY
Dimensions in meters
Environment: perfect ground

wire	caps	Distance	Angle	Z	radius	segs
1	none	0	0	0	1.56	2
		0	0	17.		
2	none	0	0	17.	.91	2
		0	0	34.		
3	none	0	0	34.	.4	2
		0	0	51.		
4	none	0	0	51.	.26	2
		0	0	68.		
5	none	0	0	68.	.025	1
		2.	0	68.		
6	none	0	0	68.	.025	1
		2.	-300.	68.		
7	none	0	0	68.	.025	1
		2.	-240.	68.		
8	none	0	0	68.	.025	1
		2.	-180.	68.		
9	none	0	0	68.	.025	1
		2.	-120.	68.		
10	none	0	0	68.	.025	1
		2.	-60.	68.		
11	none	0	0	68.	.003	1
		2.	-350.	68.		
12	none	0	0	68.	.003	1
		2.	-340.	68.		
13	none	0	0	68.	.003	1
		2.	-330.	68.		
14	none	0	0	68.	.003	1
		2.	-320.	68.		
15	none	0	0	68.	.003	1
		2.	-310.	68.		
16	none	0	0	68.	.003	1
		2.	-290.	68.		
17	none	0	0	68.	.003	1
		2.	-280.	68.		
18	none	0	0	68.	.003	1
		2.	-270.	68.		
19	none	0	0	68.	.003	1
		2.	-260.	68.		
20	none	0	0	68.	.003	1
		2.	-250.	68.		

21	none	0	0	68.	.003	1
		2.	-230.	68.		
22	none	0	0	68.	.003	1
		2.	-220.	68.		
23	none	0	0	68.	.003	1
		2.	-210.	68.		
24	none	0	0	68.	.003	1
		2.	-200.	68.		
25	none	0	0	68.	.003	1
		2.	-190.	68.		
26	none	0	0	68.	.003	1
		2.	-170.	68.		
27	none	0	0	68.	.003	1
		2.	-160.	68.		
28	none	0	0	68.	.003	1
		2.	-150.	68.		
29	none	0	0	68.	.003	1
		2.	-140.	68.		
30	none	0	0	68.	.003	1
		2.	-130.	68.		
31	none	0	0	68.	.003	1
		2.	-110.	68.		
32	none	0	0	68.	.003	1
		2.	-100.	68.		
33	none	0	0	68.	.003	1
		2.	-90.	68.		
34	none	0	0	68.	.003	1
		2.	-80.	68.		
35	none	0	0	68.	.003	1
		2.	-70.	68.		
36	none	0	0	68.	.003	1
		2.	-50.	68.		
37	none	0	0	68.	.003	1
		2.	-40.	68.		
38	none	0	0	68.	.003	1
		2.	-30.	68.		
39	none	0	0	68.	.003	1
		2.	-20.	68.		
40	none	0	0	68.	.003	1
		2.	-10.	68.		
41	none	74.206	0	0	1.56	2
		74.206	0	17.		
42	none	74.206	0	17.	.91	2
		74.206	0	34.		
43	none	74.206	0	34.	.4	2
		74.206	0	51.		
44	none	74.206	0	51.	.26	2
		74.206	0	68.		
45	none	74.206	0	68.	.025	1
		76.206	0	68.		
46	none	74.206	0	68.	.025	1
		75.2259	-358.681	68.		

47	none	74.206	0	68.	.025	1
		73.2265	-358.645	68.		
48	none	74.206	0	68.	.025	1
		72.206	0	68.		
49	none	74.206	0	68.	.025	1
		73.2265	-1.35536	68.		
50	none	74.206	0	68.	.025	1
		75.2259	-1.31933	68.		
51	none	74.206	0	68.	.003	1
		76.1764	-359.739	68.		
52	none	74.206	0	68.	.003	1
		76.0885	-359.485	68.		
53	none	74.206	0	68.	.003	1
		75.9446	-359.246	68.		
54	none	74.206	0	68.	.003	1
		75.749	-359.028	68.		
55	none	74.206	0	68.	.003	1
		75.5071	-358.837	68.		
56	none	74.206	0	68.	.003	1
		74.9136	-358.562	68.		
57	none	74.206	0	68.	.003	1
		74.5793	-358.487	68.		
58	none	74.206	0	68.	.003	1
		74.233	-358.456	68.		
59	none	74.206	0	68.	.003	1
		73.885	-358.472	68.		
60	none	74.206	0	68.	.003	1
		73.546	-358.536	68.		
61	none	74.206	0	68.	.003	1
		72.9365	-358.796	68.		
62	none	74.206	0	68.	.003	1
		72.6853	-358.987	68.		
63	none	74.206	0	68.	.003	1
		72.4809	-359.21	68.		
64	none	74.206	0	68.	.003	1
		72.3299	-359.458	68.		
65	none	74.206	0	68.	.003	1
		72.2372	-359.725	68.		
66	none	74.206	0	68.	.003	1
		72.2372	-.275463	68.		
67	none	74.206	0	68.	.003	1
		72.3299	-.541868	68.		
68	none	74.206	0	68.	.003	1
		72.4809	-.79052	68.		
69	none	74.206	0	68.	.003	1
		72.6853	-1.01344	68.		
70	none	74.206	0	68.	.003	1
		72.9365	-1.20363	68.		
71	none	74.206	0	68.	.003	1
		73.546	-1.46429	68.		
72	none	74.206	0	68.	.003	1
		73.885	-1.52756	68.		

73	none	74.206	0	68.	.003	1
		74.233	-1.54386	68.		
74	none	74.206	0	68.	.003	1
		74.5793	-1.51334	68.		
75	none	74.206	0	68.	.003	1
		74.9136	-1.43755	68.		
76	none	74.206	0	68.	.003	1
		75.5071	-1.16265	68.		
77	none	74.206	0	68.	.003	1
		75.749	-.972443	68.		
78	none	74.206	0	68.	.003	1
		75.9446	-.754463	68.		
79	none	74.206	0	68.	.003	1
		76.0885	-.5151	68.		
80	none	74.206	0	68.	.003	1
		76.1764	-.261219	68.		
81	none	148.412	0	0	1.56	2
		148.412	0	17.		
82	none	148.412	0	17.	.91	2
		148.412	0	34.		
83	none	148.412	0	34.	.4	2
		148.412	0	51.		
84	none	148.412	0	51.	.26	2
		148.412	0	68.		
85	none	148.412	0	68.	.025	1
		150.412	0	68.		
86	none	148.412	0	68.	.025	1
		149.422	-359.336	68.		
87	none	148.412	0	68.	.025	1
		147.422	-359.327	68.		
88	none	148.412	0	68.	.025	1
		146.412	0	68.		
89	none	148.412	0	68.	.025	1
		147.422	-.673179	68.		
90	none	148.412	0	68.	.025	1
		149.422	-.664169	68.		
91	none	148.412	0	68.	.003	1
		150.382	-359.868	68.		
92	none	148.412	0	68.	.003	1
		150.293	-359.739	68.		
93	none	148.412	0	68.	.003	1
		150.147	-359.618	68.		
94	none	148.412	0	68.	.003	1
		149.95	-359.509	68.		
95	none	148.412	0	68.	.003	1
		149.705	-359.414	68.		
96	none	148.412	0	68.	.003	1
		149.108	-359.278	68.		
97	none	148.412	0	68.	.003	1
		148.772	-359.241	68.		
98	none	148.412	0	68.	.003	1
		148.426	-359.228	68.		

99	none	148.412	0	68.	.003	1
		148.078	-359.238	68.		
100	none	148.412	0	68.	.003	1
		147.74	-359.271	68.		
101	none	148.412	0	68.	.003	1
		147.134	-359.403	68.		
102	none	148.412	0	68.	.003	1
		146.886	-359.499	68.		
103	none	148.412	0	68.	.003	1
		146.683	-359.609	68.		
104	none	148.412	0	68.	.003	1
		146.534	-359.733	68.		
105	none	148.412	0	68.	.003	1
		146.443	-359.864	68.		
106	none	148.412	0	68.	.003	1
		146.443	-.13588	68.		
107	none	148.412	0	68.	.003	1
		146.534	-.267465	68.		
108	none	148.412	0	68.	.003	1
		146.683	-.390612	68.		
109	none	148.412	0	68.	.003	1
		146.886	-.501472	68.		
110	none	148.412	0	68.	.003	1
		147.134	-.596623	68.		
111	none	148.412	0	68.	.003	1
		147.74	-.728874	68.		
112	none	148.412	0	68.	.003	1
		148.078	-.762126	68.		
113	none	148.412	0	68.	.003	1
		148.426	-.772071	68.		
114	none	148.412	0	68.	.003	1
		148.772	-.758568	68.		
115	none	148.412	0	68.	.003	1
		149.108	-.722186	68.		
116	none	148.412	0	68.	.003	1
		149.705	-.586377	68.		
117	none	148.412	0	68.	.003	1
		149.95	-.491225	68.		
118	none	148.412	0	68.	.003	1
		150.147	-.3816	68.		
119	none	148.412	0	68.	.003	1
		150.293	-.260776	68.		
120	none	148.412	0	68.	.003	1
		150.382	-.132321	68.		

Number of wires = 120
current nodes = 132

	minimum		maximum	
Individual wires	wire	value	wire	value
segment length	102	1.99886	1	8.5
segment/radius ratio	1	5.44872	97	667.007

radius 11 3.E-03 1 1.56

ELECTRICAL DESCRIPTION
Frequencies (MHz)

no.	frequency lowest	step	no. of steps	segment length (wavelengths) minimum	maximum
1	1.01	0	1	6.73E-03	.0286358

Sources

source	node	sector	magnitude	phase	type
1	89	1	100.	0	voltage

Lumped loads

load	node	resistance (ohms)	reactance (ohms)	inductance (mH)	capacitance (uF)	passive circuit
1	45	0	108,500.	0	0	0
2	1	0	108,500.	0	0	0

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IMPEDANCE
normalization = 50.

freq (MHz)	resist (ohms)	react (ohms)	imped (ohms)	phase (deg)	VSWR	S11 dB	S12 dB
source = 1; node 89, sector 1							
1.01	26.866	-33.551	42.982	308.7	2.8904	-6.2688	-1.1697

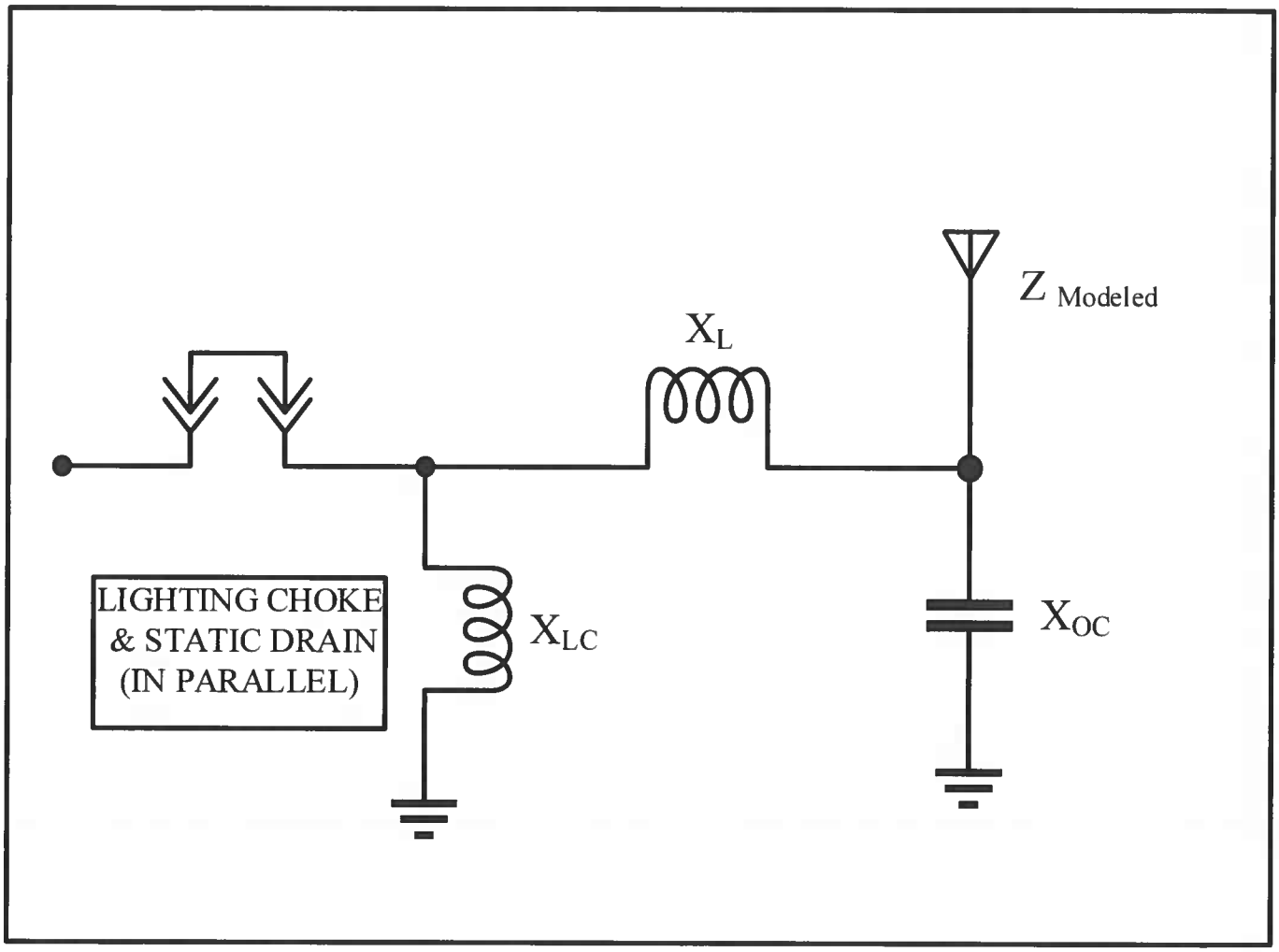
Item 3

Method of Moments Model Details for Directional Antenna- KIQI

The array of towers was modeled using MININEC with the individual tower characteristics that were verified by the individual tower impedance measurements. Calculations were made to determine the complex voltage values for sources located at ground level under each tower of the array to produce current moment sums for the towers that, when normalized, equated to the theoretical field parameters of the authorized directional antenna patterns. In the schematic diagram on the following page,

Xo_C represents the capacitance between the tower and ground, including the base insulator
X_S represents the series inductance of the feed line connecting the ATU to the tower
X_{LC} represents the reactance of the tower static drain choke and lighting choke

In all cases, the modeled impedance at the reference point is within one ohm of the measured reference point impedance.



TOWER	X_{LC} (Ω)	X_L (Ω)	X_{OC} (Ω)	$Z_{MODELED}$ (Ω)	$Z_{ATU\ MODELED}$ (Ω)	$Z_{ATU\ MEASURED}$ (Ω)
#1E	+J4601	+J21.2	-J4822	26.87-J33.55	26.6-J12.1	26.6-J12.3
#2C	+J4601	+J16.3	-J4822	25.23-J33.91	25.1-J17.4	25.2-J17.6
#3W	+J4601	+J16.7	-J4822	26.87-J33.55	26.7-J16.7	26.6-J16.8

Hatfield & Dawson Consulting Engineers	ANALYSIS OF TOWER IMPEDANCE MEASUREMENTS TO VERIFY METHOD OF MOMENTS MODEL RADIO STATION KIQI 1010 kHz SAN FRANCISCO, CA 06/2019

KIQI Driven Array

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KIQI CP Pattern at 10 kW

GEOMETRY
Dimensions in meters
Environment: perfect ground

wire	caps	Distance	Angle	Z	radius	segs
1	none	0	0	0	1.56	2
		0	0	17.		
2	none	0	0	17.	.91	2
		0	0	34.		
3	none	0	0	34.	.4	2
		0	0	51.		
4	none	0	0	51.	.26	2
		0	0	68.		
5	none	0	0	68.	.025	1
		2.	0	68.		
6	none	0	0	68.	.025	1
		2.	-300.	68.		
7	none	0	0	68.	.025	1
		2.	-240.	68.		
8	none	0	0	68.	.025	1
		2.	-180.	68.		
9	none	0	0	68.	.025	1
		2.	-120.	68.		
10	none	0	0	68.	.025	1
		2.	-60.	68.		
11	none	0	0	68.	.003	1
		2.	-350.	68.		
12	none	0	0	68.	.003	1
		2.	-340.	68.		
13	none	0	0	68.	.003	1
		2.	-330.	68.		
14	none	0	0	68.	.003	1
		2.	-320.	68.		
15	none	0	0	68.	.003	1
		2.	-310.	68.		
16	none	0	0	68.	.003	1
		2.	-290.	68.		
17	none	0	0	68.	.003	1
		2.	-280.	68.		
18	none	0	0	68.	.003	1
		2.	-270.	68.		
19	none	0	0	68.	.003	1
		2.	-260.	68.		
20	none	0	0	68.	.003	1
		2.	-250.	68.		

21	none	0	0	68.	.003	1
		2.	-230.	68.		
22	none	0	0	68.	.003	1
		2.	-220.	68.		
23	none	0	0	68.	.003	1
		2.	-210.	68.		
24	none	0	0	68.	.003	1
		2.	-200.	68.		
25	none	0	0	68.	.003	1
		2.	-190.	68.		
26	none	0	0	68.	.003	1
		2.	-170.	68.		
27	none	0	0	68.	.003	1
		2.	-160.	68.		
28	none	0	0	68.	.003	1
		2.	-150.	68.		
29	none	0	0	68.	.003	1
		2.	-140.	68.		
30	none	0	0	68.	.003	1
		2.	-130.	68.		
31	none	0	0	68.	.003	1
		2.	-110.	68.		
32	none	0	0	68.	.003	1
		2.	-100.	68.		
33	none	0	0	68.	.003	1
		2.	-90.	68.		
34	none	0	0	68.	.003	1
		2.	-80.	68.		
35	none	0	0	68.	.003	1
		2.	-70.	68.		
36	none	0	0	68.	.003	1
		2.	-50.	68.		
37	none	0	0	68.	.003	1
		2.	-40.	68.		
38	none	0	0	68.	.003	1
		2.	-30.	68.		
39	none	0	0	68.	.003	1
		2.	-20.	68.		
40	none	0	0	68.	.003	1
		2.	-10.	68.		
41	none	74.206	0	0	1.56	2
		74.206	0	17.		
42	none	74.206	0	17.	.91	2
		74.206	0	34.		
43	none	74.206	0	34.	.4	2
		74.206	0	51.		
44	none	74.206	0	51.	.26	2
		74.206	0	68.		
45	none	74.206	0	68.	.025	1
		76.206	0	68.		
46	none	74.206	0	68.	.025	1
		75.2259	-358.681	68.		

47	none	74.206	0	68.	.025	1
		73.2265	-358.645	68.		
48	none	74.206	0	68.	.025	1
		72.206	0	68.		
49	none	74.206	0	68.	.025	1
		73.2265	-1.35536	68.		
50	none	74.206	0	68.	.025	1
		75.2259	-1.31933	68.		
51	none	74.206	0	68.	.003	1
		76.1764	-359.739	68.		
52	none	74.206	0	68.	.003	1
		76.0885	-359.485	68.		
53	none	74.206	0	68.	.003	1
		75.9446	-359.246	68.		
54	none	74.206	0	68.	.003	1
		75.749	-359.028	68.		
55	none	74.206	0	68.	.003	1
		75.5071	-358.837	68.		
56	none	74.206	0	68.	.003	1
		74.9136	-358.562	68.		
57	none	74.206	0	68.	.003	1
		74.5793	-358.487	68.		
58	none	74.206	0	68.	.003	1
		74.233	-358.456	68.		
59	none	74.206	0	68.	.003	1
		73.885	-358.472	68.		
60	none	74.206	0	68.	.003	1
		73.546	-358.536	68.		
61	none	74.206	0	68.	.003	1
		72.9365	-358.796	68.		
62	none	74.206	0	68.	.003	1
		72.6853	-358.987	68.		
63	none	74.206	0	68.	.003	1
		72.4809	-359.21	68.		
64	none	74.206	0	68.	.003	1
		72.3299	-359.458	68.		
65	none	74.206	0	68.	.003	1
		72.2372	-359.725	68.		
66	none	74.206	0	68.	.003	1
		72.2372	-.275463	68.		
67	none	74.206	0	68.	.003	1
		72.3299	-.541868	68.		
68	none	74.206	0	68.	.003	1
		72.4809	-.79052	68.		
69	none	74.206	0	68.	.003	1
		72.6853	-1.01344	68.		
70	none	74.206	0	68.	.003	1
		72.9365	-1.20363	68.		
71	none	74.206	0	68.	.003	1
		73.546	-1.46429	68.		
72	none	74.206	0	68.	.003	1
		73.885	-1.52756	68.		

73	none	74.206	0	68.	.003	1
		74.233	-1.54386	68.		
74	none	74.206	0	68.	.003	1
		74.5793	-1.51334	68.		
75	none	74.206	0	68.	.003	1
		74.9136	-1.43755	68.		
76	none	74.206	0	68.	.003	1
		75.5071	-1.16265	68.		
77	none	74.206	0	68.	.003	1
		75.749	-.972443	68.		
78	none	74.206	0	68.	.003	1
		75.9446	-.754463	68.		
79	none	74.206	0	68.	.003	1
		76.0885	-.5151	68.		
80	none	74.206	0	68.	.003	1
		76.1764	-.261219	68.		
81	none	148.412	0	0	1.56	2
		148.412	0	17.		
82	none	148.412	0	17.	.91	2
		148.412	0	34.		
83	none	148.412	0	34.	.4	2
		148.412	0	51.		
84	none	148.412	0	51.	.26	2
		148.412	0	68.		
85	none	148.412	0	68.	.025	1
		150.412	0	68.		
86	none	148.412	0	68.	.025	1
		149.422	-359.336	68.		
87	none	148.412	0	68.	.025	1
		147.422	-359.327	68.		
88	none	148.412	0	68.	.025	1
		146.412	0	68.		
89	none	148.412	0	68.	.025	1
		147.422	-.673179	68.		
90	none	148.412	0	68.	.025	1
		149.422	-.664169	68.		
91	none	148.412	0	68.	.003	1
		150.382	-359.868	68.		
92	none	148.412	0	68.	.003	1
		150.293	-359.739	68.		
93	none	148.412	0	68.	.003	1
		150.147	-359.618	68.		
94	none	148.412	0	68.	.003	1
		149.95	-359.509	68.		
95	none	148.412	0	68.	.003	1
		149.705	-359.414	68.		
96	none	148.412	0	68.	.003	1
		149.108	-359.278	68.		
97	none	148.412	0	68.	.003	1
		148.772	-359.241	68.		
98	none	148.412	0	68.	.003	1
		148.426	-359.228	68.		

99	none	148.412	0	68.	.003	1
		148.078	-359.238	68.		
100	none	148.412	0	68.	.003	1
		147.74	-359.271	68.		
101	none	148.412	0	68.	.003	1
		147.134	-359.403	68.		
102	none	148.412	0	68.	.003	1
		146.886	-359.499	68.		
103	none	148.412	0	68.	.003	1
		146.683	-359.609	68.		
104	none	148.412	0	68.	.003	1
		146.534	-359.733	68.		
105	none	148.412	0	68.	.003	1
		146.443	-359.864	68.		
106	none	148.412	0	68.	.003	1
		146.443	-.13588	68.		
107	none	148.412	0	68.	.003	1
		146.534	-.267465	68.		
108	none	148.412	0	68.	.003	1
		146.683	-.390612	68.		
109	none	148.412	0	68.	.003	1
		146.886	-.501472	68.		
110	none	148.412	0	68.	.003	1
		147.134	-.596623	68.		
111	none	148.412	0	68.	.003	1
		147.74	-.728874	68.		
112	none	148.412	0	68.	.003	1
		148.078	-.762126	68.		
113	none	148.412	0	68.	.003	1
		148.426	-.772071	68.		
114	none	148.412	0	68.	.003	1
		148.772	-.758568	68.		
115	none	148.412	0	68.	.003	1
		149.108	-.722186	68.		
116	none	148.412	0	68.	.003	1
		149.705	-.586377	68.		
117	none	148.412	0	68.	.003	1
		149.95	-.491225	68.		
118	none	148.412	0	68.	.003	1
		150.147	-.3816	68.		
119	none	148.412	0	68.	.003	1
		150.293	-.260776	68.		
120	none	148.412	0	68.	.003	1
		150.382	-.132321	68.		

Number of wires = 120
current nodes = 132

	minimum		maximum	
Individual wires	wire	value	wire	value
segment length	102	1.99886	1	8.5
segment/radius ratio	1	5.44872	97	667.007

radius 11 3.E-03 1 1.56

ELECTRICAL DESCRIPTION
Frequencies (MHz)

no.	frequency lowest	step	no. of steps	segment length (wavelengths) minimum	maximum
1	1.01	0	1	6.73E-03	.0286358

Sources

source	node	sector	magnitude	phase	type
1	1	1	692.863	279.1	voltage
2	45	1	864.051	181.7	voltage
3	89	1	371.242	141.1	voltage

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IMPEDANCE
normalization = 50.

freq (MHz)	resist (ohms)	react (ohms)	imped (ohms)	phase (deg)	VSWR	S11 dB	S12 dB
source = 1; node 1, sector 1							
1.01	5.8181	-43.275	43.664	277.7	15.081	-1.1536	-6.3215
source = 2; node 45, sector 1							
1.01	17.891	-24.926	30.682	305.7	3.5668	-5.0045	-1.6488
source = 3; node 89, sector 1							
1.01	22.13	14.558	26.489	33.3	2.4922	-7.3853	-.87558

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CURRENT rms
Frequency = 1.01 MHz
Input power = 10,000. watts
Efficiency = 100. %
coordinates in meters

current no.	X	Y	Z	mag (amps)	phase (deg)	real (amps)	imaginary (amps)
GND	**0**	**0**	**0**	**11.2205**	**1.4**	**11.2171**	**.27368**
2	0	0	8.5	10.0435	.7	10.0428	.114255
END	0	0	17.	8.97248	.2	8.97242	.0327742
2J1	0	0	17.	8.97248	.2	8.97242	.0327742
4	0	0	25.5	7.95632	359.9	7.9563	-.0156007
END	0	0	34.	6.58593	359.5	6.5857	-.0541271
2J2	0	0	34.	6.58593	359.5	6.5857	-.0541271
6	0	0	42.5	5.42003	359.3	5.41958	-.0697153
END	0	0	51.	3.98853	359.	3.98788	-.0716795
2J3	0	0	51.	3.98853	359.	3.98788	-.0716795
8	0	0	59.5	2.583	358.7	2.58234	-.0583796
END	0	0	68.	1.06139	358.4	1.061	-.0287839

2J4	0	0	68.	.0417995	358.7	.0417894	-9.17E-04
END	2.	0	68.	0	0	0	0
2J4	0	0	68.	.0416428	358.6	.0416302	-1.02E-03
END	1.	-1.73205	68.	0	0	0	0
2J4	0	0	68.	.041341	358.3	.0413227	-1.23E-03
END	-1.	-1.73205	68.	0	0	0	0
2J4	0	0	68.	.0411957	358.2	.0411743	-1.33E-03
END	-2.	0	68.	0	0	0	0
2J4	0	0	68.	.041341	358.3	.0413227	-1.23E-03
END	-1.	1.73205	68.	0	0	0	0
2J4	0	0	68.	.0416428	358.6	.0416302	-1.02E-03
END	1.	1.73205	68.	0	0	0	0
2J4	0	0	68.	.0259997	358.7	.0259933	-5.72E-04
END	1.96962	-.347296	68.	0	0	0	0
2J4	0	0	68.	.0279821	358.7	.0279752	-6.23E-04
END	1.87939	-.68404	68.	0	0	0	0
2J4	0	0	68.	.0283786	358.7	.0283713	-6.43E-04
END	1.73205	-1.	68.	0	0	0	0
2J4	0	0	68.	.0279472	358.7	.0279397	-6.47E-04
END	1.53209	-1.28558	68.	0	0	0	0
2J4	0	0	68.	.025936	358.6	.0259287	-6.16E-04
END	1.28558	-1.53209	68.	0	0	0	0
2J4	0	0	68.	.025872	358.5	.0258635	-6.6E-04
END	.68404	-1.87939	68.	0	0	0	0
2J4	0	0	68.	.0278214	358.5	.0278117	-7.33E-04
END	.347296	-1.96962	68.	0	0	0	0
2J4	0	0	68.	.0281966	358.4	.0281862	-7.67E-04
END	0	-2.	68.	0	0	0	0
2J4	0	0	68.	.0277544	358.4	.0277435	-7.79E-04
END	-.347296	-1.96962	68.	0	0	0	0
2J4	0	0	68.	.0257499	358.3	.0257391	-7.43E-04
END	-.68404	-1.87939	68.	0	0	0	0
2J4	0	0	68.	.0256889	358.3	.0256769	-7.84E-04
END	-1.28558	-1.53209	68.	0	0	0	0
2J4	0	0	68.	.0276345	358.2	.0276212	-8.59E-04
END	-1.53209	-1.28558	68.	0	0	0	0
2J4	0	0	68.	.0280225	358.2	.0280085	-8.84E-04
END	-1.73205	-1.	68.	0	0	0	0
2J4	0	0	68.	.0276024	358.2	.0275884	-8.81E-04
END	-1.87939	-.684041	68.	0	0	0	0
2J4	0	0	68.	.0256303	358.2	.0256171	-8.23E-04
END	-1.96962	-.347297	68.	0	0	0	0
2J4	0	0	68.	.0256303	358.2	.0256171	-8.23E-04
END	-1.96962	.347296	68.	0	0	0	0
2J4	0	0	68.	.0276024	358.2	.0275884	-8.81E-04
END	-1.87939	.68404	68.	0	0	0	0
2J4	0	0	68.	.0280224	358.2	.0280085	-8.84E-04
END	-1.73205	1.	68.	0	0	0	0
2J4	0	0	68.	.0276345	358.2	.0276212	-8.59E-04
END	-1.53209	1.28558	68.	0	0	0	0
2J4	0	0	68.	.0256889	358.3	.0256769	-7.84E-04
END	-1.28558	1.53209	68.	0	0	0	0

2J4	0	0	68.	.0257499	358.3	.0257391	-7.43E-04
END	-.68404	1.87939	68.	0	0	0	0
2J4	0	0	68.	.0277544	358.4	.0277435	-7.79E-04
END	-.347296	1.96962	68.	0	0	0	0
2J4	0	0	68.	.0281966	358.4	.0281862	-7.67E-04
END	0	2.	68.	0	0	0	0
2J4	0	0	68.	.0278214	358.5	.0278117	-7.33E-04
END	.347297	1.96962	68.	0	0	0	0
2J4	0	0	68.	.0258719	358.5	.0258635	-6.6E-04
END	.684041	1.87939	68.	0	0	0	0
2J4	0	0	68.	.025936	358.6	.0259287	-6.16E-04
END	1.28558	1.53209	68.	0	0	0	0
2J4	0	0	68.	.0279472	358.7	.0279397	-6.47E-04
END	1.53209	1.28558	68.	0	0	0	0
2J4	0	0	68.	.0283786	358.7	.0283713	-6.43E-04
END	1.73205	1.	68.	0	0	0	0
2J4	0	0	68.	.0279821	358.7	.0279752	-6.23E-04
END	1.87939	.68404	68.	0	0	0	0
2J4	0	0	68.	.0259997	358.7	.0259933	-5.72E-04
END	1.96962	.347296	68.	0	0	0	0
GND	**74.206**	**0**	**0**	**19.9129**	**236.**	**-11.1219**	**-16.5175**
46	74.206	0	8.5	18.555	233.9	-10.9365	-14.9893
END	74.206	0	17.	16.9387	232.8	-10.2426	-13.4911
2J41	74.206	0	17.	16.9387	232.8	-10.2426	-13.4911
48	74.206	0	25.5	15.2362	232.1	-9.35892	-12.023
END	74.206	0	34.	12.7947	231.4	-7.97723	-10.0034
2J42	74.206	0	34.	12.7947	231.4	-7.97723	-10.0034
50	74.206	0	42.5	10.6326	231.	-6.69307	-8.2617
END	74.206	0	51.	7.90213	230.6	-5.02096	-6.10194
2J43	74.206	0	51.	7.90213	230.6	-5.02096	-6.10194
52	74.206	0	59.5	5.16042	230.2	-3.30391	-3.9641
END	74.206	0	68.	2.13654	229.9	-1.37693	-1.63367
2J44	74.206	0	68.	.0836577	230.1	-.0536235	-.0642117
END	76.206	0	68.	0	0	0	0
2J44	74.206	0	68.	.0834251	230.	-.0536199	-.0639113
END	75.206	-1.7316	68.	0	0	0	0
2J44	74.206	0	68.	.0833373	229.7	-.0538533	-.0635997
END	73.206	-1.73159	68.	0	0	0	0
2J44	74.206	0	68.	.0833995	229.6	-.0540382	-.0635245
END	72.206	0	68.	0	0	0	0
2J44	74.206	0	68.	.0834626	229.7	-.053934	-.0636955
END	73.206	1.73205	68.	0	0	0	0
2J44	74.206	0	68.	.0835858	230.	-.053723	-.0640345
END	75.206	1.73205	68.	0	0	0	0
2J44	74.206	0	68.	.0520238	230.1	-.0333496	-.0399285
END	76.1756	-.346975	68.	0	0	0	0
2J44	74.206	0	68.	.0560427	230.1	-.0359345	-.0430057
END	76.0854	-.683915	68.	0	0	0	0
2J44	74.206	0	68.	.0567823	230.1	-.0364228	-.0435615
END	75.938	-.99937	68.	0	0	0	0
2J44	74.206	0	68.	.0559516	230.1	-.0359086	-.0429088
END	75.7381	-1.28496	68.	0	0	0	0

2J44	74.206	0	68.	.0521458	230.	-.0334868	-.0399728
END	75.4916	-1.53253	68.	0	0	0	0
2J44	74.206	0	68.	.0521637	230.	-.0335587	-.0399358
END	74.89	-1.87994	68.	0	0	0	0
2J44	74.206	0	68.	.0558197	229.9	-.0359421	-.0427085
END	74.5533	-1.96916	68.	0	0	0	0
2J44	74.206	0	68.	.0568055	229.9	-.0366093	-.0434354
END	74.206	-2.00018	68.	0	0	0	0
2J44	74.206	0	68.	.0560914	229.8	-.0361812	-.0428621
END	73.8587	-1.97019	68.	0	0	0	0
2J44	74.206	0	68.	.0518535	229.8	-.0334767	-.0395992
END	73.522	-1.87899	68.	0	0	0	0
2J44	74.206	0	68.	.0520556	229.7	-.033667	-.0397029
END	72.9204	-1.53256	68.	0	0	0	0
2J44	74.206	0	68.	.0558288	229.7	-.0361301	-.0425614
END	72.6739	-1.28501	68.	0	0	0	0
2J44	74.206	0	68.	.0566067	229.6	-.0366521	-.0431387
END	72.474	-.999341	68.	0	0	0	0
2J44	74.206	0	68.	.0558998	229.6	-.036208	-.0425884
END	72.3267	-.684186	68.	0	0	0	0
2J44	74.206	0	68.	.0518703	229.6	-.0336061	-.0395115
END	72.2364	-.346692	68.	0	0	0	0
2J44	74.206	0	68.	.0518966	229.6	-.033623	-.0395316
END	72.2364	.347296	68.	0	0	0	0
2J44	74.206	0	68.	.0558596	229.6	-.0361821	-.0425577
END	72.3267	.684041	68.	0	0	0	0
2J44	74.206	0	68.	.0566875	229.6	-.0367043	-.0432003
END	72.474	1.	68.	0	0	0	0
2J44	74.206	0	68.	.0558692	229.7	-.0361561	-.0425923
END	72.6739	1.28558	68.	0	0	0	0
2J44	74.206	0	68.	.0519234	229.7	-.0335818	-.0396018
END	72.9204	1.53209	68.	0	0	0	0
2J44	74.206	0	68.	.0519364	229.8	-.0335301	-.0396627
END	73.522	1.87939	68.	0	0	0	0
2J44	74.206	0	68.	.0559247	229.8	-.0360739	-.0427346
END	73.8587	1.96961	68.	0	0	0	0
2J44	74.206	0	68.	.0567636	229.9	-.0365824	-.0434033
END	74.206	2.	68.	0	0	0	0
2J44	74.206	0	68.	.0559536	229.9	-.0360281	-.042811
END	74.5533	1.96962	68.	0	0	0	0
2J44	74.206	0	68.	.0519862	230.	-.0334447	-.0397997
END	74.89	1.87938	68.	0	0	0	0
2J44	74.206	0	68.	.0520164	230.	-.0334038	-.0398734
END	75.4916	1.53209	68.	0	0	0	0
2J44	74.206	0	68.	.0560159	230.1	-.0359497	-.0429581
END	75.7381	1.28558	68.	0	0	0	0
2J44	74.206	0	68.	.0568286	230.1	-.0364525	-.043597
END	75.938	1.	68.	0	0	0	0
2J44	74.206	0	68.	.0560405	230.1	-.0359332	-.043004
END	76.0854	.684041	68.	0	0	0	0
2J44	74.206	0	68.	.0520404	230.1	-.0333602	-.0399412
END	76.1756	.347297	68.	0	0	0	0

GND	**148.412**	**0**	**0**	**9.90997**	**107.7**	**-3.02062**	**9.4384**
90	148.412	0	8.5	10.0044	105.3	-2.63812	9.65025
END	148.412	0	17.	9.48587	104.2	-2.32959	9.19537
2J81	148.412	0	17.	9.48587	104.2	-2.32959	9.19537
92	148.412	0	25.5	8.73171	103.6	-2.05273	8.48699
END	148.412	0	34.	7.49309	103.	-1.69116	7.29975
2J82	148.412	0	34.	7.49309	103.	-1.69116	7.29975
94	148.412	0	42.5	6.31311	102.7	-1.38894	6.15843
END	148.412	0	51.	4.75438	102.4	-1.02108	4.64343
2J83	148.412	0	51.	4.75438	102.4	-1.02108	4.64343
96	148.412	0	59.5	3.13795	102.2	-.661287	3.06748
END	148.412	0	68.	1.31097	102.	-.272221	1.28239
2J84	148.412	0	68.	.0509942	102.5	-.0110001	.0497937
END	150.412	0	68.	0	0	0	0
2J84	148.412	0	68.	.051102	102.2	-.0108209	.0499432
END	149.412	-1.73159	68.	0	0	0	0
2J84	148.412	0	68.	.0512799	101.7	-.0104426	.0502054
END	147.412	-1.73157	68.	0	0	0	0
2J84	148.412	0	68.	.0515269	101.5	-.0102794	.0504911
END	146.412	0	68.	0	0	0	0
2J84	148.412	0	68.	.0514022	101.8	-.0104677	.0503251
END	147.412	1.73205	68.	0	0	0	0
2J84	148.412	0	68.	.051122	102.2	-.0108251	.0499627
END	149.412	1.73205	68.	0	0	0	0
2J84	148.412	0	68.	.0317083	102.4	-6.84E-03	.0309627
END	150.382	-.346399	68.	0	0	0	0
2J84	148.412	0	68.	.0342262	102.4	-7.37E-03	.0334241
END	150.291	-.684567	68.	0	0	0	0
2J84	148.412	0	68.	.0346926	102.4	-7.45E-03	.0338838
END	150.144	-1.00099	68.	0	0	0	0
2J84	148.412	0	68.	.0341913	102.4	-7.31E-03	.0333997
END	149.945	-1.28496	68.	0	0	0	0
2J84	148.412	0	68.	.0316552	102.3	-6.74E-03	.0309287
END	149.697	-1.53107	68.	0	0	0	0
2J84	148.412	0	68.	.0317713	102.1	-6.68E-03	.0310604
END	149.096	-1.87884	68.	0	0	0	0
2J84	148.412	0	68.	.034471	102.1	-7.21E-03	.0337092
END	148.759	-1.97071	68.	0	0	0	0
2J84	148.412	0	68.	.0347781	102.	-7.22E-03	.0340195
END	148.413	-1.99981	68.	0	0	0	0
2J84	148.412	0	68.	.0342963	101.9	-7.08E-03	.0335579
END	148.065	-1.96925	68.	0	0	0	0
2J84	148.412	0	68.	.0320123	101.8	-6.57E-03	.0313319
END	147.728	-1.8797	68.	0	0	0	0
2J84	148.412	0	68.	.0321677	101.7	-6.51E-03	.0315023
END	147.126	-1.53299	68.	0	0	0	0
2J84	148.412	0	68.	.0342505	101.6	-6.9E-03	.0335489
END	146.88	-1.28436	68.	0	0	0	0
2J84	148.412	0	68.	.0351451	101.6	-7.05E-03	.0344306
END	146.68	-1.00094	68.	0	0	0	0
2J84	148.412	0	68.	.0344614	101.5	-6.89E-03	.0337652
END	146.532	-.682821	68.	0	0	0	0

2J84	148.412	0	68.	.0320077	101.5	-6.39E-03	.0313634
END	146.443	-.347544	68.	0	0	0	0
2J84	148.412	0	68.	.032009	101.5	-6.39E-03	.0313647
END	146.443	.347297	68.	0	0	0	0
2J84	148.412	0	68.	.0345201	101.5	-6.9E-03	.0338226
END	146.532	.68404	68.	0	0	0	0
2J84	148.412	0	68.	.0350264	101.6	-7.03E-03	.0343144
END	146.68	.999999	68.	0	0	0	0
2J84	148.412	0	68.	.0343996	101.6	-6.93E-03	.0336949
END	146.88	1.28558	68.	0	0	0	0
2J84	148.412	0	68.	.0320237	101.7	-6.48E-03	.0313613
END	147.126	1.53208	68.	0	0	0	0
2J84	148.412	0	68.	.0319338	101.8	-6.55E-03	.031255
END	147.728	1.87939	68.	0	0	0	0
2J84	148.412	0	68.	.0343539	101.9	-7.09E-03	.0336143
END	148.065	1.96962	68.	0	0	0	0
2J84	148.412	0	68.	.0348229	102.	-7.23E-03	.0340633
END	148.413	2.00001	68.	0	0	0	0
2J84	148.412	0	68.	.0342738	102.1	-7.17E-03	.0335164
END	148.759	1.96961	68.	0	0	0	0
2J84	148.412	0	68.	.0318418	102.1	-6.7E-03	.0311294
END	149.096	1.87939	68.	0	0	0	0
2J84	148.412	0	68.	.0317327	102.3	-6.76E-03	.0310044
END	149.697	1.53209	68.	0	0	0	0
2J84	148.412	0	68.	.0342702	102.4	-7.33E-03	.0334769
END	149.945	1.28558	68.	0	0	0	0
2J84	148.412	0	68.	.0346134	102.4	-7.43E-03	.0338065
END	150.144	.999998	68.	0	0	0	0
2J84	148.412	0	68.	.0341751	102.4	-7.36E-03	.0333741
END	150.291	.684041	68.	0	0	0	0
2J84	148.412	0	68.	.0317304	102.4	-6.84E-03	.0309843
END	150.382	.347298	68.	0	0	0	0

C:\Muticultural Stations\KIQI Mininec Files\MININEC Files\kiqi05A3
CURRENT MOMENTS(amp-meters) rms

Frequency = 1.01 MHz
Input power = 10,000. watts

			vertical current moment	
wire	magnitude	phase (deg)	magnitude	phase (deg)
1	242.092	.8	242.092	.8
2	189.152	359.9	189.152	359.9
3	128.709	359.3	128.709	359.3
4	67.7809	358.8	67.7809	358.8
5	0	0	0	0
6	0	0	0	0
7	0	0	0	0
8	0	0	0	0
9	0	0	0	0
10	0	0	0	0
11	0	0	0	0
12	0	0	0	0
13	0	0	0	0
14	0	0	0	0
15	0	0	0	0
16	0	0	0	0
17	0	0	0	0
18	0	0	0	0
19	0	0	0	0
20	0	0	0	0
21	0	0	0	0
22	0	0	0	0
23	0	0	0	0
24	0	0	0	0
25	0	0	0	0
26	0	0	0	0
27	0	0	0	0
28	0	0	0	0
29	0	0	0	0
30	0	0	0	0
31	0	0	0	0
32	0	0	0	0
33	0	0	0	0
34	0	0	0	0
35	0	0	0	0
36	0	0	0	0
37	0	0	0	0
38	0	0	0	0
39	0	0	0	0
40	0	0	0	0
41	444.443	234.2	444.443	234.2
42	361.849	232.2	361.849	232.2
43	252.206	231.	252.206	231.
44	135.209	230.3	135.209	230.3
45	0	0	0	0

46	0	0	0	0
47	0	0	0	0
48	0	0	0	0
49	0	0	0	0
50	0	0	0	0
51	0	0	0	0
52	0	0	0	0
53	0	0	0	0
54	0	0	0	0
55	0	0	0	0
56	0	0	0	0
57	0	0	0	0
58	0	0	0	0
59	0	0	0	0
60	0	0	0	0
61	0	0	0	0
62	0	0	0	0
63	0	0	0	0
64	0	0	0	0
65	0	0	0	0
66	0	0	0	0
67	0	0	0	0
68	0	0	0	0
69	0	0	0	0
70	0	0	0	0
71	0	0	0	0
72	0	0	0	0
73	0	0	0	0
74	0	0	0	0
75	0	0	0	0
76	0	0	0	0
77	0	0	0	0
78	0	0	0	0
79	0	0	0	0
80	0	0	0	0
81	236.777	105.6	236.777	105.6
82	207.007	103.6	207.007	103.6
83	149.5	102.8	149.5	102.8
84	82.055	102.2	82.055	102.2
85	0	0	0	0
86	0	0	0	0
87	0	0	0	0
88	0	0	0	0
89	0	0	0	0
90	0	0	0	0
91	0	0	0	0
92	0	0	0	0
93	0	0	0	0
94	0	0	0	0
95	0	0	0	0
96	0	0	0	0
97	0	0	0	0

98	0	0	0	0
99	0	0	0	0
100	0	0	0	0
101	0	0	0	0
102	0	0	0	0
103	0	0	0	0
104	0	0	0	0
105	0	0	0	0
106	0	0	0	0
107	0	0	0	0
108	0	0	0	0
109	0	0	0	0
110	0	0	0	0
111	0	0	0	0
112	0	0	0	0
113	0	0	0	0
114	0	0	0	0
115	0	0	0	0
116	0	0	0	0
117	0	0	0	0
118	0	0	0	0
119	0	0	0	0
120	0	0	0	0

Medium wave array vertical current moment (amps-meters) rms
(Calculation assumes tower wires are grouped together.
The first wire of each group must contain the source.)

tower	magnitude	phase (deg)
1	627.687	360.
2	1,193.32	232.5
3	675.162	104.

These values normalize to within 0.15% amplitude and to identical phase of the far field antenna parameters.

Comparison of Current Moments with Theoretical Antenna Field Parameters

Tower	Current Moment Magnitude	Current Moment Phase	Normalized Magnitude	Normalized Phase	Standard Pattern Ratio*	Standard Pattern Phase
1	627.687	360.0	0.526	127.5	0.526	127.5
2	1193.32	232.5	1.000	0	1.0	0
3	675.162	104.0	0.566	-128.5	0.565	-128.5

*Normalized to center tower reference

Item 4

Derivation of Operating Parameters for Directional Antennas - KIQI

The method of moments model of the array, following verification with the measured individual open circuited base impedances, was used for directional antenna calculations. Calculations were made to determine the complex voltage values for sources located at ground level at the base of each tower of the array to produce current moment sums for the towers that, when normalized, equated to the theoretical field parameters of the authorized directional antenna pattern. With these voltage sources, the tower currents and phases were calculated. The moment method model is described in item 2 of this report. The currents and voltages at the tower bases (wire segments 1, 41, and 81 which are nodes 1, 45 and 89) were used to calculate the currents at the sample device locations by Kirchoff's law, using the analysis program NETBW.

Antenna Monitor Parameters - Night Pattern - KIQI

Tower	Ref Point Current Magnitude	Ref Point Current Phase	Normalized Magnitude	Normalized Phase
1 E	11.269	1.4	0.566	+125.4
2 C	19.977	236.0	1.0	0
3 W	9.948	107.7	0.498	-128.3

The base model shown in item 3 has essentially negligible phase shift, so the reference point phase values are the same as the moment method calculated base values. The slight transformation of the resistance values causes the reference point current ratios to differ from the tower base current ratios.

Summary of Post Construction Array Geometry - KIQI

As the KIQI antenna has been previously licensed by means of a traditional measurement based proof of performance, a post-construction survey is not required.

Ground System

Unchanged from licensed description.

Item 6

Sampling System Measurements - KIQI

Impedance measurements were made of the antenna monitor sampling system using a Hewlett Packard 8751A network analyzer in a calibrated measurement system. The measurements were made looking into the antenna monitor ends of the sampling lines for two conditions – with and without the sampling lines connected to the sampling transformers at the antenna tuning units.

The sample lines are equal lengths of ½" Heliax type cable.

The following table shows the frequency closest to the carrier frequency where series resonance – zero reactance corresponding with low resistance – was found. As frequencies of resonance occur at odd multiples of 90 degrees electrical length, the sampling line length at the resonant frequency above carrier frequency – which is the closest one to the carrier frequency – was found to be 270 electrical degrees. The electrical length at carrier frequency appearing in the table below was calculated by multiplying 270 degrees by the ratio of the carrier frequency (1010 kHz) to the resonant frequency.

Sample Line Measurements - KIQI

Tower	Sample Line Open Circuited Resonant Frequency (kHz)	Sample Line Electrical Length at 1010 kHz (Degrees)	Measured Impedance at 1010 kHz with Sample Transformer Connected
1 E	1035.2	263.4	48.2 -j1.15
2 C	1038.4	262.6	49.8 -j1.00
3 W	1036.8	263.0	48.2 -j1.25

The sample line lengths meet the requirement that they be equal in length to within 1 electrical degree.

In order to determine the characteristic impedance values of the sampling lines, open-circuited measurements were made with frequencies offset to produce +/- 45 degrees of electrical length from resonance. The characteristic impedance was calculated using the following formula, where R1 +j X1 and R2 +j X2 are the measured impedances at the +45 and –45 degree offset frequencies, respectively:

$$Zo = ((R_1^2 + X_1^2)^{1/2} \times (R_2^2 + X_2^2)^{1/2})^{1/2}$$

KIQI Sample Line Characteristic Impedance Calculations

Tower	-45° Offset Frequency (kHz)	-45° Offset Measured Impedance	+45° Offset Frequency (kHz)	+45° Measured Impedance	Calculated Characteristic Impedance
1 E	865.33	3.79-j49.48	1211.46	5.53+j50.09	50.01
2 C	862.66	3.865-j49.46	1207.73	5.67+j50.03	49.98
3 W	864.007	3.785-j49.97	1209.6	5.56+j50.27	50.18

The sample line measured characteristic impedances meet the requirement that they be equal within 2 ohms.

The sample current transformers were tested by feeding their outputs to the "A" and "B" inputs of the network analyzer, while feeding the output of the network analyzer through the sample transformers and into a resistive load. The transformers were in agreement with the reference tower transformer to within 0.5° of phase and 0.45% of ratio, well within the manufacturer's specifications.

Sample Transformer Data

Tower Number	Location	Ratio Δ	Phase Δ	Serial Number
1	East	0.995	-0.437	16334
2	Center	reference	reference	16336
3	West	0.994	0.37	16335

The antenna monitor was tested by feeding a single RF source through a "T" connector, with the outputs of the "T" then fed to the reference tower input and each or the non-reference tower inputs via short equal length jumper cables. In this configuration, the antenna monitor indicates a ratio of 1.00 and a phase angle of zero for all towers. Its amplitude and phase readings also agree with those obtained from the Hewlett-Packard 8753 network analyzer used to make the measurements in this report.

Item 7

Reference Field Strength Measurements - KIQI

Reference field strength measurements were made along radials of minimum and maximum radiation for the directional pattern. The transmitter power was adjusted to 10.53 kW for the nighttime pattern measurements.

Measurements were made using a Potomac Instruments field strength meter, model FIM-21, serial 1008. This meter was calibrated by the manufacturer on May 24 of this year.
All measurements were taken by KIQI engineer Arthur Lebermann.

The measured field strengths and descriptions including GPS (NAD83) coordinates for the reference measurement points are shown on the following pages.

FIELD MEASUREMENTS FOR KIQI-AM (1010 KHz)

Measurements made between 6/12 and 6/23/2019 by Art Lebermann, contract engineer for MRBI, San Francisco.

Measurements made with Potomac Instruments FIM-21, s/n 1008 Factory calibration, 5/24/2019

Measurements referenced to the Center Tower (Twr. #2) of the directional array:

N 37-49-34
W 122-18-37
NAD27 datum

26.9 DEGREE RADIAL:

Point #1 - 2.65 miles
2551 San Pablo Ave., Berkeley, CA
N 37-51-36.8
W 122-17-17.2
17 mv / m

Point #2 - 3.75 miles
California @ Francisco, Berkeley, CA
N 37-52-27.7
W 122-16-46.0
10 mv / m

Point #3 - 4.49 miles
1204 Bonita, Berkeley, CA
N 37-53-06.2
W 122-16-20.2
4 mv / m

93.1 DEGREE RADIAL:

Point #1 - 1.70 miles
Adeline @ 34th Street, Oakland, CA
N 37-49-31.2
W 122-16-45.7
36 mv / m

Point #2 - 3.06 miles
Piedmont @ Yosemite, Oakland, CA
N 37-49-27.1
W 122-15-16.2
32 mv / m

Point #3 - 3.75 miles
1116 Oakland Ave., Piedmont, CA
N 37-49-22.6
W 122-14-30.8
27 mv / m

131.6 DEGREE RADIAL:

Point #1 - 1.47 miles
Mandela Parkway @ 15th Street, Oakland, CA
N 37-48-43.3
W 122-17-25.4
100 mv / m

Point #2 - 3.19 miles
Madison @ 4th Street, Oakland, CA
N 37-47-41.7
W 122-16-02.8
64 mv / m

Point #3 - 5.17 miles
2400 Embarcadero, Oakland, CA
N 37-46-35.2
W 122-14-23.6
17 mv / m

240.4 DEGREE RADIAL (Main Lobe):

Point #1 - 4.90 miles
Embarcadero @ Folsom, San Francisco, CA
N 37-47-25.3
W 122-23-15.7
165 mv / m

Point #2 - 7.00 miles
Gough @ Fell St., San Francisco, CA
N 37-46-34.0
W 122-25-18.3
26 mv / m

Point #3 - 9.77 miles
10th Ave. @ Moraga, San Francisco, CA
N 37-45-23.1
W 122-27-57.2
11 mv / m

348.4 DEGREE RADIAL

Point #1 - 0.95 miles
Powell St., Marina Park, Parking Lot #3, Emeryville, CA
N 37-50-22.7
W 122-18-51.0
95 mv / m

Point #2 - 3.34 miles
Northwest corner of Cesar Chavez State Park, Berkeley, CA
N 37-52-24.9
W 122-19-21.7
31 mv / m

Point #3 - 7.01 miles
3319 Cutting Blvd., Richmond, CA
N 37-55-31.6
W 122-20-11.5
13 mv / m

****

POTOMAC INSTRUMENTS, inc.
Frederick, Maryland

CERTIFICATE OF CALIBRATION

Field Intensity Meter Type FIM-21 Serial Number 1008

This instrument was calibrated in an induction field of 220.0 millivolts per meter. At each measurement frequency the measured field was recorded and a correction factor K was computed; the indicated field must be multiplied by K to obtain the true field.

kHz	K	kHz	K
540	1.000	1100	1.000
600	1.000	1200	1.000
700	1.000	1300	1.000
800	1.000	1400	1.000
900	1.000	1500	1.005
1000	1.000	1600	1.005

The calibrating field is maintained equal to the National Institute of Standards and Technology (NIST) standard field within an accuracy of 1.0 percent. NIST states that the absolute accuracy of its field is "believed to be within 3.0 percent."

The error at points on the meter scale other than the calibration point is less than 3.0 percent. The attenuator ratios are correct within 2.0 percent. These accuracies apply for battery voltages that are indicated by the instrument's battery check circuit to be useable.

NEXT RECOMMENDED CALIBRATION DATE: May 23, 2021

Calibrated by Zachary Babendreier Date: May 24, 2019

Direct Measurement of Power - KIQI

Common point impedance measurements were made using a Hewlett Packard 8751A network analyzer in a calibrated measurement system. The measurements were made at the phasor cabinet input jack adjacent to the common point current meter that is used to determine operating power. The common point impedance was adjusted to 50 +/- j0 at the common point, then the reactance was adjusted for minimum reflected power at the transmitter output. The final measured common point impedance is 50 -j1.5

Certification

This Engineering Report has been prepared personally by the undersigned or under my immediate supervision, and all representations are true and correct to the best of my knowledge. I am an experienced radio engineer whose qualifications are a matter of record with the Federal Communications Commission, I am an engineer in the firm of Hatfield & Dawson Consulting Engineers, LLC, and I am Registered as a Professional Engineer in the States of Washington and California.

APPENDIX A: Construction Permit BMP-20181207AAR

United States of America

FEDERAL COMMUNICATIONS COMMISSION

AM BROADCAST STATION CONSTRUCTION PERMIT

Authorizing Official:

Official Mailing Address:

MULTICULTURAL RADIO BROADCASTING LICENSEE, LI
27 WILLIAM STREET
11TH FLOOR
NEW YORK NY 10005

Son Nguyen
Supervisory Engineer
Audio Division
Media Bureau

Facility Id: 50703

Call Sign: KIQI

Permit File Number: BMP-20181207AAR

Grant Date: February 26, 2019

The authority granted herein has no effect on the expiration date of the underlying construction permit.

This permit modifies permit no.: BMP-20181207AAR to change nighttime pattern and power to 10.0kW

Subject to the provisions of the Communications Act of 1934, as amended, subsequent acts and treaties, and all regulations heretofore or hereafter made by this Commission, and further subject to the conditions set forth in this permit, the permittee is hereby authorized to construct the radio transmitting apparatus herein described. Installation and adjustment of equipment not specifically set forth herein shall be in accordance with representations contained in the permittee's application for construction permit except for such modifications as are presently permitted, without application, by the Commission's Rules.

Commission rules which became effective on February 16, 1999, have a bearing on this construction permit. See Report & Order, Streamlining of Mass Media Applications, MM Docket No. 98-43, 13 FCC RCD 23056, Para. 77-90 (November 25, 1998); 63 Fed. Reg. 70039 (December 18, 1998). Pursuant to these rules, this construction permit will be subject to automatic forfeiture unless construction is complete and an application for license to cover is filed prior to expiration. See Section 73.3598.

Equipment and program tests shall be conducted only pursuant to Sections 73.1610 and 73.1620 of the Commission's Rules.

Hours of Operation: Unlimited

Average hours of sunrise and sunset:
Local Standard Time (Non-Advanced)

Jan.	7:30 AM	5:15 PM	Jul.	5:00 AM	7:30 PM
Feb.	7:00 AM	5:45 PM	Aug.	5:30 AM	7:00 PM
Mar.	6:15 AM	6:15 PM	Sep.	5:45 AM	6:15 PM
Apr.	5:30 AM	6:45 PM	Oct.	6:15 AM	5:30 PM
May	5:00 AM	7:15 PM	Nov.	6:45 AM	5:00 PM
Jun	4:45 AM	7:30 PM	Dec	7:15 AM	4:45 PM

Name of Permittee: MULTICULTURAL RADIO BROADCASTING LICENSEE, LLC

Station Location: SAN FRANCISCO, CA

Frequency (kHz): 1010

Station Class: B

Antenna Coordinates:

		Day			
Latitude:	N	37 Deg	49 Min	34 Sec	
Longitude:	W	122 Deg	18 Min	41 Sec	

		Night			
Latitude:	N	37 Deg	49 Min	34 Sec	
Longitude:	W	122 Deg	18 Min	41 Sec	

Transmitter(s): Type Accepted. See Sections 73.1660, 73.1665 and 73.1670 of the Commission's Rules.

Nominal Power (kW): Day: 10.0 Night: 10.0

Antenna Mode: Day: DA Night: DA

(DA=Directional Antenna, ND=Non-directional Antenna; CH=Critical Hours)

Antenna Registration Number(s):

Day:

Tower No.	ASRN	Overall Height (m)
1	1056743	
2	1056742	
3	1056741	

Night:

Tower No.	ASRN	Overall Height (m)
1	1056743	
2	1056742	
3	1056741	

Callsign: KIQI Permit No.: BMP-20181207AAR

DESCRIPTION OF DIRECTIONAL ANTENNA SYSTEM

Theoretical RMS (mV/m/km): Day: 930.2 Night: 1034.65

Standard RMS (mV/m/km): Night: 1086.92

Augmented RMS (mV/m/km): Day: 1015

Q Factor: Day: Night:

Theoretical Parameters:

Day Directional Antenna:

Tower No.	Field Ratio	Phasing (Deg.)	Spacing (Deg.)	Orientation (Deg.)	Tower Ref Switch *	Height (Deg.)
1	0.4300	-110.200	0.0000	0.000	0	TL/S
2	1.1420	117.900	90.0000	240.000	0	TL/S
3	1.0000	0.000	180.0000	240.000	0	TL/S

* Tower Reference Switch
0 = Spacing and orientation from reference tower
1 = Spacing and orientation from previous tower

Top-Loaded/Sectionalized Tower Parameters: (See 47 CFR 73.160)

Tower No.	A	B	C	D
1	75.4	14.60	.00	.00
2	75.4	14.60	.00	.00
3	75.4	14.60	.00	.00

Augmentation Parameters:

Aug No.	Central Azimuth (Deg. T)	Span (Deg.)	Radiation at Central Azimuth (mV/m @ 1 km)
1	7.0	34.0	265.54
2	24.0	34.0	196.34
3	41.0	14.0	144.84
4	48.0	14.0	144.84
5	79.0	30.0	144.84
6	94.0	30.0	189.90
7	112.0	36.0	252.67
8	130.0	10.0	317.04
9	172.0	36.0	1029.98
10	190.0	20.0	1367.94
11	200.0	16.0	1528.88
12	208.0	16.0	1641.53
13	240.0	17.0	1786.37
14	248.5	17.0	1818.56
15	270.0	40.0	1697.86
16	290.0	20.0	1528.88

Special operating conditions or restrictions:

2 Antenna Registration and Operating Tower #1, #2 & #3 refer to tower #1(E), #2(C) and #3(W).

3 Licensee shall be responsible for satisfying all reasonable complaints of blanketing interference within the 1 V/m contour as required by Section 73.88 of the Commission's rules.

4 A license application (FCC Form 302) to cover this construction permit must be filed with the Commission pursuant to Section 73.3536 of the Rules before the permit expires.

5 The permittee/licensee in coordination with other users of the site must reduce power or cease operation as necessary to protect persons having access to the site, tower or antenna from radiofrequency electromagnetic fields in excess of FCC guidelines.

6 Permittee shall install a type-accepted transmitter, or submit application (FCC Form 301) along with data prescribed in Section 73.1660(b) should non type-accepted transmitter be proposed.

7 The permittee must submit a proof of performance as set forth in either Section 73.151(a) or 73.151(c) of the rules before program tests are authorized.
A proof of performance based on field strength measurements, per Section 73.151(a), shall include a complete nondirectional proof of performance, in addition to a complete proof on the night directional antenna system. The nondirectional and directional field strength measurements must be made under similar environmental conditions. The proof of performance submitted to the Commission must contain all of the data specified in Section 73.186 of the rules.
Permittees who elect to submit a moment method proof of performance, as set forth in Section 73.151(c), must use series-fed radiators. In addition, the sampling system must be constructed as described in Section 73.151(c) (2) (i).

*** END OF AUTHORIZATION ***

APPENDIX B: FCC Form 302-AM

SECTION III - LICENSE APPLICATION ENGINEERING DATA

Name of Applicant

MULTICULTURAL RADIO BROADCASTING LICENSEE, LLC

PURPOSE OF AUTHORIZATION APPLIED FOR: (check one)

[x] 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
KIQI	BMP-20181207AAR	1010	UNLIMITED	10.0	10.0

2. Station location

State	City or Town
CALIFORNIA	SAN FRANCISCO

3. Transmitter location

State	County	City or Town	Street address (or other identification)
CA	ALAMEDA	OAKLAND	#1 RADIO ROAD

4. Main studio location

State	County	City or Town	Street address (or other identification)
CA	SAN FRANCISCO	SAN FRANCISCO	44 GOUGH ST. #301

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

State	County	City or Town	Street address (or other identification)
CA	SAN FRANCISCO	SAN FRANCISCO	44 GOUGH ST. #301

6. Has type-approved stereo generating equipment been installed? [ ] Yes [X] No

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

Attach as an Exhibit a detailed description of the sampling system as installed. Exhibit No. ENG. RPT.

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
14.49 AMPS	14.49 AMPS

Measured antenna or common point resistance (in ohms) at operating frequency		Measured antenna or common point reactance (in ohms) at operating frequency	
Night	Day	Night	Day
50.0	50.0	+j 1.5	+j 1.5

Antenna indications for directional operation

Towers	Antenna monitor Phase reading(s) in degrees		Antenna monitor sample current ratio(s)		Antenna base currents	
	Night	Day	Night	Day	Night	Day
1 EAST	125.4	-114.2	0.566	0.489	NOT	NOT
2 CENTER	0	114.7	1.0	1.231	REQUIRED	REQUIRED
3 WEST	-128.3	0	0.498	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.
Self supporting tapered lattice towers	62.2	64.6/64.3/65.2	65.5/65.2/66.1	Exhibit No. Eng. Rpt.

Excitation [X] 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 °	49 '	34 "		122 °	18 '	37 "

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. ENG. RPT

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

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

NONE

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

MODIFICATION TO IMPLEMENT 10.0 KW NIGHTTIME OPERATION

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)
BENJ. F. DAWSON III, P.E.	Benj. F. Dawson
Address (include ZIP Code) HATFIELD & DAWSON CONSULTING ENGINEERS 9500 GREENWOOD AVENUE NORTH SEATTLE, WA 98103	Date JUNE 30, 2019 Telephone No. (Include Area Code) 206 783 9151

[ ] Technical Director

[X] Registered Professional Engineer

[ ] Chief Operator

[ ] Technical Consultant

[X] Other (specify) Consulting Engineer