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. BAML-20121005AGW

## SECTION I - APPLICANT FEE INFORMATION

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

MAILING ADDRESS (Line 1) (Maximum 35 characters)
KZSF 1370-AM

MAILING ADDRESS (Line 2) (Maximum 35 characters)
2347 BERING DRIVE

| 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) |
|---|---|---|
| 4085467201 | 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):

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 | $ 635.00 | |

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 | $ 730.00 | |

| | 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. | $ 1365.00 | |

| SECTION II - APPLICANT INFORMATION | | |
|---|---|---|
| 1. NAME OF APPLICANT<br>CARLOS A. DUHARTE | | |
| MAILING ADDRESS<br>KZSF 1370-AM, 2347 BERING DRIVE | | |
| CITY<br>SAN JOSE | STATE<br>CA | ZIP CODE<br>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. see Exh. 4

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. 4

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. see Exh. 4

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 | 10/02/2012 | 4085467201 |

**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

KZSF License Co.

PURPOSE OF AUTHORIZATION APPLIED FOR: (check one)

[X] Station License [X] 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 | not applicable | 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 St. |

4. Main studio location

| State | County | City or Town | Street address (or other identification) |
|---|---|---|---|
| CA | Santa Clara | San Jose | 2347 Bering Drive |

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 | 2347 Bering Drive |

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 |
|---|---|
| 10.4 | 10.4 |

| 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 | +/-j0 | +/-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 |
| 1 C | ref | ref | 1.0 | 1.0 | not | not |
| 2 E | 71.3 | 71.3 | 0.395 | 0.395 | required | required |
| 3 N | -79.5 | -79.5 | 0.305 | 0.305 | | |
| 4 W | -109.1 | -109.1 | 0.699 | 0.699 | | |
| | | | | | | |
| | | | | | | |

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 towers<br>* see item 11 | 59.4 | 60.4 | 60.4 (no lighting | Exhibit No. DNA |

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 ° | 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. dna

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

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

No change from originally licensed system

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

No change - rebuild following destruction of site by fire

*ASR #s 1215674, 1215676, 1215678, 1215679
no lighting or marking required

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. | |
| Address (include ZIP Code)<br>Hatfield & Dawson Consulting Engineers<br>9500 Greenwood Avenue North<br>Seattle, WA 98103 | Date<br>September 28, 2012 |
| | Telephone No. (Include Area Code)<br>206 783 9151 |

[ ] Technical Director

[X] Registered Professional Engineer

[ ] Chief Operator

[ ] Technical Consultant

[X] Other (specify) Consulting Engineer

KZSF, SAN JOSE, CALIFORNIA
FACILITY ID 68841

FORM 302-AM

EXHIBIT 4

The answer to Question 4 in Section II is "not applicable," because there is no construction permit involved. Rather, this is an application for a direct measurement of power necessitated by the accidental destruction of, and the need to rebuild, the station's facilities.

KZSF, SAN JOSE, CALIFORNIA
FACILITY ID 68841

FORM 302-AM

EXHIBIT 5

SEE EXHIBIT 4

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CONSULTANT

MAURY L. HATFIELD, PE
(1942-2009)
PAUL W. LEONARD, PE
(1925-2011)

# Application for License

## KZSF (AM)

## San Jose, CA

## 1370 kHz

## 5.0 kW Unlimited Time DA-1

KZSF License Co.

September, 2012

# APPLICATION FOR LICENSE

RADIO STATION KZSF-AM San Jose, CA
1370 kHz, 5 kW Unlimited Time DA-1

Purpose of Application

| | |
|---|---|
| Item 1 | Tower Impedance Measurements and Verification of Method of Moments Model |
| Item 2 | Derivation of Operating Parameters for Directional Antenna |
| Item 3 | Method of Moments Model Details for Towers Driven Individually |
| Item 4 | Method of Moments Model Details for Directional Antenna Pattern |
| Item 5 | Post Construction Array Geometry Statement |
| Item 6 | Sampling System Measurements |
| Item 7 | Reference Field Strength Measurements |
| Item 8 | Direct Measurement of Power |
| Item 9 | Antenna Monitor and Sampling System |
| Item 10 | Harmonic and Intermodulation Measurements |
| Appendix A | License BL-19950203AA |
| Appendix B | FCC Form 302-AM |

**Purpose of Application**

This engineering exhibit supports an application for license for the authorized directional antenna system for radio station KZSF, San Jose, CA. KZSF operates on 1370 kHz with a power of 5 kW, with the same directional antenna parameters for day and night operation.

The most recent complete KZSF license document is BL-19950203AA, and a copy is included in this report as Exhibit A. Note that the license document does NOT have the correct data for the antenna pattern parameters, as the towers are numbered incorrectly and the phase angles of two of them are incorrect. The FCC engineering database also has the towers incorrectly numbered, but the electrical and geometric parameters are correct. The correct parameters and numbering (to be consistent with the license of KSJX, which also uses the antenna system) are:

| Towers | 1(C) | 2 (E) | 3 (N) | 4 (W) |
|---|---|---|---|---|
| Spacing | Ref | 123.3° | 82.2° | 91.3° |
| Orientation | Ref | 61.0° | 341.0° | 251.0° |
| Field Ratio | 1.0 | 0.407 | 0.371 | 0.875 |
| Phasing | 0.0° | 71.4° | -92.6° | -119.0° |

These parameters are those shown in this license application data.

Information is provided herein demonstrating that the directional antenna parameters for the patterns authorized by the station license 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 used in this report were made by Robert Turner, Stephen Lockwood, or by the undersigned.

Benjamin F. Dawson III, P.E.

**Item 1**

**Analysis of Tower Impedance Measurements to Verify Method of Moments Model - KZSF**

Tower base impedance measurements were made at the locations of the outputs of the antenna coupling units 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.

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 following table. The base conditions shown for each tower, which includes the stray capacitances were used in the moment method model as a load at ground level for the open circuited case. The towers each have a lighting choke used as a static drain inductor.

In addition to the page showing the schematic of the assumed circuit and tabulation of calculated values, a page showing the results of calculations using the NETBW circuit analysis program is included. These calculations show the impedance transformations and phase shifts between the tower base values produced by MININEC and the location of the current sample devices used to produce the antenna monitor input signals.

The following table shows the allowable range of modeled impedance values.

KZSF Tower Measurement Matrix

| Tower # | R open | Hi Limit | Lo Limit | X open | Hi Limit | Lo Limit |
|---|---|---|---|---|---|---|
| 1 | 67.10 | 71.78 | 62.42 | 148.00 | 155.92 | 140.08 |
| 2 | 79.20 | 84.37 | 74.03 | 159.30 | 167.67 | 150.93 |
| 3 | 73.95 | 78.91 | 68.99 | 138.40 | 145.94 | 130.86 |
| 4 | 81.60 | 86.86 | 76.34 | 150.00 | 158.00 | 142.00 |

**NETBW CALCULATION OF TOWER IMPEDANCE MEASUREMENTS TO VERIFY METHOD OF MOMENTS MODEL**

Tower #1 C

| FREQUENCY (KHZ) | LOAD RESISTANCE | LOAD REACTANCE | INPUT RESISTANCE | INPUT REACTANCE |
|---|---|---|---|---|
| 1370 | 65.423 | 107.33 | 67.26281 | 147.4029 |
| -.6499855 | | | | |

Tower #2 E

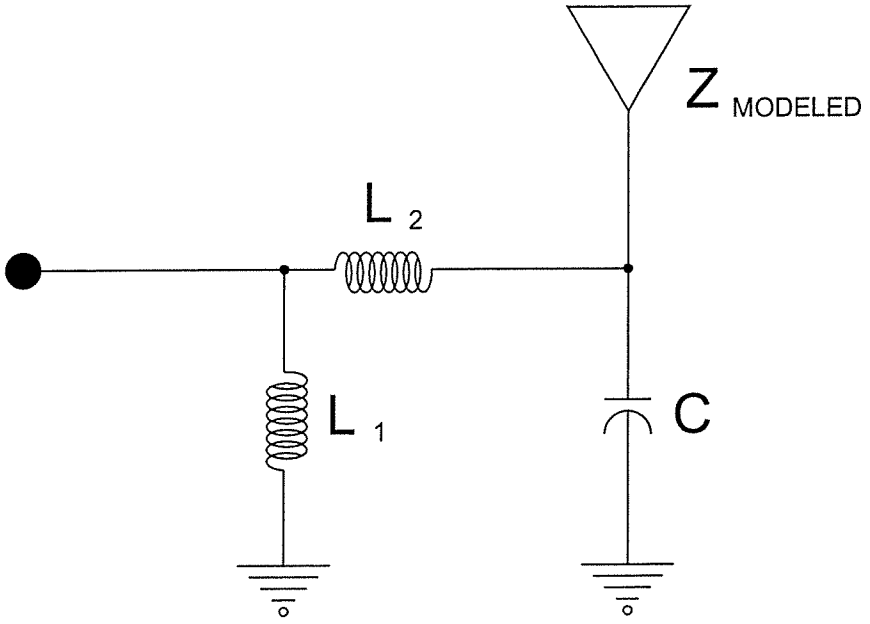
| FREQUENCY (KHZ) | LOAD RESISTANCE | LOAD REACTANCE | INPUT RESISTANCE | INPUT REACTANCE |
|---|---|---|---|---|
| 1370 | 76.996 | 112.14 | 79.16642 | 158.8123 |
| -.7659962 | | | | |

Tower #3 N

| FREQUENCY (KHZ) | LOAD RESISTANCE | LOAD REACTANCE | INPUT RESISTANCE | INPUT REACTANCE |
|---|---|---|---|---|
| 1370 | 71.112 | 113.37 | 73.50812 | 138.9715 |
| -.7064364 | | | | |

Tower #4 W

| FREQUENCY (KHZ) | LOAD RESISTANCE | LOAD REACTANCE | INPUT RESISTANCE | INPUT REACTANCE |
|---|---|---|---|---|
| 1370 | 78.468 | 121.96 | 81.31525 | 149.5965 |
| -.7807848 | | | | |




| TOWER | $L_1$ Z | $L_2$ Z | C Z | MODEL Z | INPUT Z | MEAS Z |
|---|---|---|---|---|---|---|
| #1 C | +j8850 | +j40 | -j3537 | 65.42 +j107.33 | 67.26 +j147.40 | 67.1 +j148.0 |
| #2 E | +j8850 | +j47 | -j3537 | 77.00 +j112.14 | 79.17 +j158.81 | 79.2 +j159.3 |
| #3 N | +j8850 | +j25 | -j3537 | 71.11 +j113.37 | 73.51 +j138.97 | 73.95 +j138.4 |
| #4 W | +j8850 | +j27 | -j3537 | 78.47 +j121.96 | 81.32 +j149.60 | 81.6 +j150.0 |

$L_1$ INCLUDES STRAY CAPACITANCE AND LIGHTING CHOKE USED AS STATIC DRAIN

$L_2$ INCLUDES HOOKUP REACTANCE AND SERIES FILTER STRAY INDUCTANCE

**Item 2**

**Derivation of Operating Parameters for Directional Antenna - KZSF**

The method of moments model of the array, following verification with the measured individual open circuited base impedances, was utilized for directional antenna calculations. 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. With these voltage sources, the tower currents were calculated. Twenty segments were used for each tower.

**NETBW CALCULATIONS OF OPERATING PARAMETERS**
**FROM METHOD OF MOMENTS MODEL**

Tower #1 C

| FREQUENCY (KHZ) | LOAD RESISTANCE | LOAD REACTANCE | INPUT RESISTANCE | INPUT REACTANCE |
|---|---|---|---|---|
| 1370 | 40.725 | 80.215 | 41.48257 | 120.1238 |
| -.4027249 | | | | |

Tower #2 E

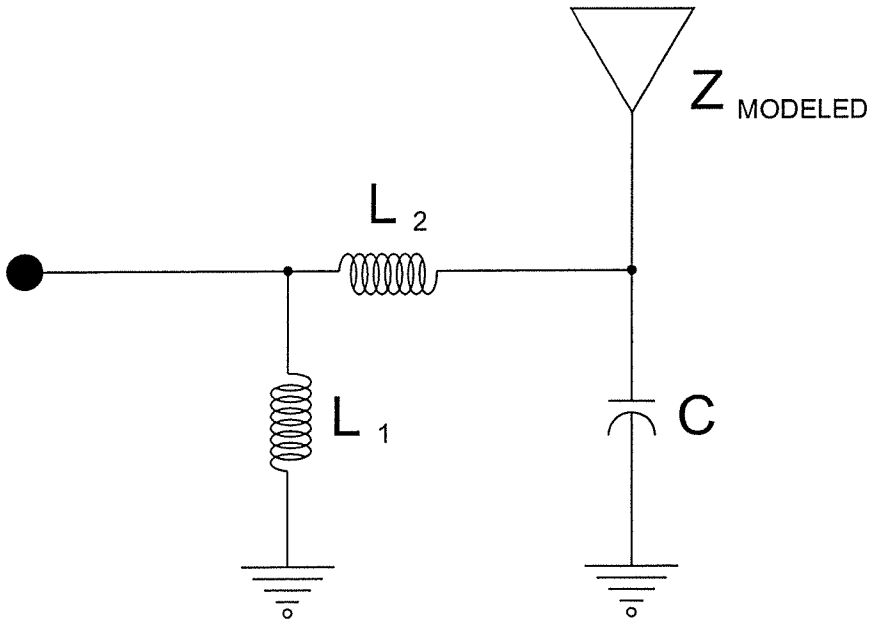
| FREQUENCY (KHZ) | LOAD RESISTANCE | LOAD REACTANCE | INPUT RESISTANCE | INPUT REACTANCE |
|---|---|---|---|---|
| 1370 | 39.869 | 97.39601 | 40.7891 | 144.4654 |
| -.3956419 | | | | |

Tower #3 N

| FREQUENCY (KHZ) | LOAD RESISTANCE | LOAD REACTANCE | INPUT RESISTANCE | INPUT REACTANCE |
|---|---|---|---|---|
| 1370 | 175.86 | 158.25 | 184.502 | 180.9709 |
| -1.760254 | | | | |

Tower #4 W

| FREQUENCY (KHZ) | LOAD RESISTANCE | LOAD REACTANCE | INPUT RESISTANCE | INPUT REACTANCE |
|---|---|---|---|---|
| 1370 | 143.77 | 170.61 | 151.4688 | 197.7447 |
| -1.442538 | | | | |




| TOWER | MODEL $I_{MAG}$ | INPUT $I_{MAG}$ | MODEL PHASE | INPUT PHASE | NORMALIZED $I_{MAG}$ PHASE |
|---|---|---|---|---|---|
| #1 C | 6.0567 | 6.001 | 4.50 | 4.903 | 1.0 / 0 |
| #2 E | 2.3777 | 2.351 | 75.8 | 76.20 | 0.395 / 71.3 |
| #3 N | 1.8730 | 1.829 | 283.6 | 285.36 | 0.305 / -79.5 |
| #4 W | 4.3044 | 4.194 | 254.4 | 255.84 | 0.699 / -109.1 |

Bob Allen, H&D 6/12/2012 1:27 PM KZSF-KSJX CIRCUIT MOM TABLE.dwg

HATFIELD & DAWSON
CONSULTING ENGINEERS

DERIVATION OF OPERATING PARAMETERS
FROM METHOD OF MOMENT MODEL

RADIO STATION KZSF SAN JOSE, CA 06/2012

**Item 3**

**Method of Moments Model Details for Towers Driven Individually - KZSF**

The array of towers was modeled using MININEC.
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. Each tower was modeled using 20 wire segments. As the towers are physically 97.8 degrees in electrical height, the segment length is 4.89 electrical degrees.

Each tower's modeled height relative to its physical height falls within the required range of 75 to 125 percent and each modeled radius falls within the required range of 80 percent to 150 percent of the radius of a circle having a circumference equal to the sum of the widths of the tower sides. The array consists of non-identical, uniform cross section towers having face widths of 18 inches.

| Tower | Physical Height (degrees) | Modeled Height (degrees) | Modeled Percentage of Height | Modeled Radius (meters) | Percent of Equivalent Radius |
|---|---|---|---|---|---|
| 1 | 97.8 | 104.9 | 107.26 | 0.218 | 100.0 |
| 2 | 97.8 | 105.3 | 107.67 | 0.218 | 100.0 |
| 3 | 97.8 | 105.3 | 107.67 | 0.218 | 100.0 |
| 4 | 97.8 | 107.2 | 109.61 | 0.218 | 100.0 |

The following pages show the details of the method of moments models for the individually driven towers.

## KZSF Tower 1 Driven, Towers 2, 3 & 4 Open Circuit at Current Transformer Location

E:\KSJX and KZSF Rebuild\kzsf-1E  06-10-2012  18:40:51

KZSF 1370 San Jose

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

| wire | caps | Distance | Angle | Z | radius | segs |
|---|---|---|---|---|---|---|
| 1 | none | 0 | 0 | 0 | .218 | 20 |
| | | 0 | 0 | 104.9 | | |
| 2 | none | 123.3 | 61. | 0 | .218 | 20 |
| | | 123.3 | 61. | 105.3 | | |
| 3 | none | 82.2 | 341. | 0 | .218 | 20 |
| | | 82.2 | 341. | 105.3 | | |
| 4 | none | 91.3 | 251. | 0 | .218 | 20 |
| | | 91.3 | 251. | 107.2 | | |

Number of wires = 4
current nodes = 80

| | minimum | | maximum | |
|---|---|---|---|---|
| Individual wires | wire | value | wire | value |
| segment length | 1 | 5.245 | 4 | 5.36 |
| radius | 1 | .218 | 1 | .218 |

ELECTRICAL DESCRIPTION
Frequencies (MHz)

| | frequency | | no. of | segment length (wavelengths) | |
|---|---|---|---|---|---|
| no. | lowest | step | steps | minimum | maximum |
| 1 | 1.37 | 0 | 1 | .0145694 | .0148889 |

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 | 21 | 0 | -5,874. | 0 | 0 | 0 |
| 2 | 41 | 0 | -5,879. | 0 | 0 | 0 |
| 3 | 61 | 0 | -5,876. | 0 | 0 | 0 |

:\KSJX and KZSF Rebuild\kzsf-1E  06-10-2012  18:40:51

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 | 65.423 | 107.33 | 125.69 | 58.6 | 5.4091 | -3.2489 | -2.7841 |

E:\KSJX and KZSF Rebuild\kzsf-1E  06-10-2012  18:40:51

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 | 8.74216 | 301.4 | 4.55027 | -7.4646 |
| 2 | 0 | 0 | 5.245 | 9.29812 | 299.2 | 4.53654 | -8.11633 |
| 3 | 0 | 0 | 10.49 | 9.58396 | 298. | 4.49539 | -8.46427 |
| 4 | 0 | 0 | 15.735 | 9.75106 | 297. | 4.42713 | -8.68813 |
| 5 | 0 | 0 | 20.98 | 9.81593 | 296.2 | 4.33221 | -8.8082 |
| 6 | 0 | 0 | 26.225 | 9.78604 | 295.5 | 4.21126 | -8.83357 |
| 7 | 0 | 0 | 31.47 | 9.66565 | 294.9 | 4.06511 | -8.76925 |
| 8 | 0 | 0 | 36.715 | 9.45795 | 294.3 | 3.89472 | -8.61882 |
| 9 | 0 | 0 | 41.96 | 9.16588 | 293.8 | 3.70124 | -8.38536 |
| 10 | 0 | 0 | 47.205 | 8.79244 | 293.4 | 3.48594 | -8.07188 |
| 11 | 0 | 0 | 52.45 | 8.34084 | 292.9 | 3.25024 | -7.6815 |
| 12 | 0 | 0 | 57.695 | 7.81453 | 292.5 | 2.99564 | -7.21755 |
| 13 | 0 | 0 | 62.94 | 7.21721 | 292.2 | 2.72374 | -6.68352 |
| 14 | 0 | 0 | 68.185 | 6.55272 | 291.8 | 2.43614 | -6.08304 |
| 15 | 0 | 0 | 73.43 | 5.82486 | 291.5 | 2.13444 | -5.41969 |
| 16 | 0 | 0 | 78.675 | 5.03714 | 291.2 | 1.82011 | -4.6968 |
| 17 | 0 | 0 | 83.92 | 4.19226 | 290.9 | 1.49428 | -3.91691 |
| 18 | 0 | 0 | 89.165 | 3.29102 | 290.6 | 1.15747 | -3.08076 |
| 19 | 0 | 0 | 94.41 | 2.32939 | 290.3 | .80852 | -2.18457 |
| 20 | 0 | 0 | 99.655 | 1.29093 | 290. | .442172 | -1.21284 |
| END | 0 | 0 | 104.9 | 0 | 0 | 0 | 0 |
| GND | 59.777 | -107.841 | 0 | .0579288 | 132. | -.0387329 | .0430755 |
| 22 | 59.777 | -107.841 | 5.265 | .266948 | 131.9 | -.178447 | .198539 |
| 23 | 59.777 | -107.841 | 10.53 | .395216 | 131.9 | -.264088 | .29403 |
| 24 | 59.777 | -107.841 | 15.795 | .498286 | 131.9 | -.332802 | .370852 |
| 25 | 59.777 | -107.841 | 21.06 | .582225 | 131.9 | -.388655 | .433513 |
| 26 | 59.777 | -107.841 | 26.325 | .649551 | 131.8 | -.433339 | .483874 |
| 27 | 59.777 | -107.841 | 31.59 | .701431 | 131.8 | -.467646 | .522793 |
| 28 | 59.777 | -107.841 | 36.855 | .738508 | 131.8 | -.492024 | .550733 |
| 29 | 59.777 | -107.841 | 42.12 | .761205 | 131.7 | -.50677 | .567994 |
| 30 | 59.777 | -107.841 | 47.385 | .769859 | 131.7 | -.512128 | .574811 |
| 31 | 59.777 | -107.841 | 52.65 | .764787 | 131.7 | -.50833 | .571402 |
| 32 | 59.777 | -107.841 | 57.915 | .746318 | 131.6 | -.495617 | .557992 |
| 33 | 59.777 | -107.841 | 63.18 | .714809 | 131.6 | -.474249 | .534826 |
| 34 | 59.777 | -107.841 | 68.445 | .670639 | 131.5 | -.444506 | .502166 |
| 35 | 59.777 | -107.841 | 73.71 | .614206 | 131.5 | -.406677 | .460285 |
| 36 | 59.777 | -107.841 | 78.975 | .545881 | 131.4 | -.361039 | .409436 |
| 37 | 59.777 | -107.841 | 84.24 | .465958 | 131.3 | -.307815 | .34981 |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| 38 | 59.777 | -107.841 | 89.505 | .374505 | 131.3 | -.247089 | .281426 |
| 39 | 59.777 | -107.841 | 94.77 | .271004 | 131.2 | -.178562 | .20386 |
| 40 | 59.777 | -107.841 | 100.035 | .153399 | 131.1 | -.100923 | .115524 |
| END | 59.777 | -107.841 | 105.3 | 0 | 0 | 0 | 0 |
| GND | 77.7216 | 26.7617 | 0 | .070747 | 170.4 | -.0697633 | .0117568 |
| 42 | 77.7216 | 26.7617 | 5.265 | .326175 | 170.4 | -.321652 | .0541309 |
| 43 | 77.7216 | 26.7617 | 10.53 | .482786 | 170.5 | -.476123 | .0799362 |
| 44 | 77.7216 | 26.7617 | 15.795 | .608485 | 170.5 | -.600135 | .100454 |
| 45 | 77.7216 | 26.7617 | 21.06 | .710698 | 170.5 | -.701015 | .116918 |
| 46 | 77.7216 | 26.7617 | 26.325 | .792516 | 170.6 | -.781808 | .129839 |
| 47 | 77.7216 | 26.7617 | 31.59 | .855378 | 170.6 | -.843933 | .139462 |
| 48 | 77.7216 | 26.7617 | 36.855 | .900095 | 170.7 | -.888186 | .145935 |
| 49 | 77.7216 | 26.7617 | 42.12 | .927205 | 170.7 | -.915094 | .14937 |
| 50 | 77.7216 | 26.7617 | 47.385 | .937147 | 170.8 | -.925085 | .149876 |
| 51 | 77.7216 | 26.7617 | 52.65 | .930341 | 170.9 | -.918562 | .147572 |
| 52 | 77.7216 | 26.7617 | 57.915 | .907225 | 171. | -.895948 | .142597 |
| 53 | 77.7216 | 26.7617 | 63.18 | .86827 | 171. | -.857694 | .135106 |
| 54 | 77.7216 | 26.7617 | 68.445 | .813984 | 171.1 | -.804287 | .125274 |
| 55 | 77.7216 | 26.7617 | 73.71 | .744889 | 171.3 | -.736224 | .113287 |
| 56 | 77.7216 | 26.7617 | 78.975 | .661482 | 171.4 | -.653981 | .0993332 |
| 57 | 77.7216 | 26.7617 | 84.24 | .564162 | 171.5 | -.557934 | .0835908 |
| 58 | 77.7216 | 26.7617 | 89.505 | .453051 | 171.6 | -.448189 | .0661941 |
| 59 | 77.7216 | 26.7617 | 94.77 | .327565 | 171.7 | -.324151 | .0471713 |
| 60 | 77.7216 | 26.7617 | 100.035 | .185257 | 171.8 | -.183383 | .0262809 |
| END | 77.7216 | 26.7617 | 105.3 | 0 | 0 | 0 | 0 |
| GND | -29.7244 | 86.3258 | 0 | .0750205 | 161.4 | -.0711122 | .0238984 |
| 62 | -29.7244 | 86.3258 | 5.36 | .348659 | 161.4 | -.330506 | .111033 |
| 63 | -29.7244 | 86.3258 | 10.72 | .517116 | 161.4 | -.490223 | .16459 |
| 64 | -29.7244 | 86.3258 | 16.08 | .65251 | 161.5 | -.618624 | .207541 |
| 65 | -29.7244 | 86.3258 | 21.44 | .762765 | 161.5 | -.72322 | .242411 |
| 66 | -29.7244 | 86.3258 | 26.8 | .851141 | 161.5 | -.807103 | .270233 |
| 67 | -29.7244 | 86.3258 | 32.16 | .919151 | 161.5 | -.871704 | .291494 |
| 68 | -29.7244 | 86.3258 | 37.52 | .967626 | 161.5 | -.917813 | .306465 |
| 69 | -29.7244 | 86.3258 | 42.88 | .997126 | 161.6 | -.945952 | .315335 |
| 70 | -29.7244 | 86.3258 | 48.24 | 1.0081 | 161.6 | -.956544 | .318265 |
| 71 | -29.7244 | 86.3258 | 53.6 | 1.00099 | 161.6 | -.949995 | .315423 |
| 72 | -29.7244 | 86.3258 | 58.96 | .976257 | 161.7 | -.926734 | .306988 |
| 73 | -29.7244 | 86.3258 | 64.32 | .934406 | 161.7 | -.887227 | .293161 |
| 74 | -29.7244 | 86.3258 | 69.68 | .875987 | 161.8 | -.831977 | .274165 |
| 75 | -29.7244 | 86.3258 | 75.04 | .801568 | 161.8 | -.761509 | .25023 |
| 76 | -29.7244 | 86.3258 | 80.4 | .711704 | 161.9 | -.676331 | .221583 |
| 77 | -29.7244 | 86.3258 | 85.76 | .606841 | 161.9 | -.576849 | .188418 |
| 78 | -29.7244 | 86.3258 | 91.12 | .487142 | 162. | -.463202 | .150837 |
| 79 | -29.7244 | 86.3258 | 96.48 | .35202 | 162. | -.334816 | .108702 |
| 80 | -29.7244 | 86.3258 | 101.84 | .198888 | 162.1 | -.18922 | .0612528 |
| END | -29.7244 | 86.3258 | 107.2 | 0 | 0 | 0 | 0 |

## KZSF Tower 2 Driven, Towers 1, 3 & 4 Open Circuit at Current Transformer Location

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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 21, sector 1 | | | | | | | |
| 1.37 | 76.996 | 112.14 | 136.02 | 55.5 | 5.2656 | -3.3396 | -2.7042 |

## KZSF Tower 3 Driven, Towers 1, 2 & 4 Open Circuit at Current Transformer Location

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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 41, sector 1 | | | | | | | |
| 1.37 | 71.112 | 113.37 | 133.83 | 57.9 | 5.5605 | -3.1585 | -2.867 |

## KZSF Tower 4 Driven, Towers 1, 2 & 3 Open Circuit at Current Transformer Location

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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 61, sector 1 | | | | | | | |
| 1.37 | 78.468 | 121.96 | 145.02 | 57.2 | 5.8261 | -3.0115 | -3.0091 |

**Item 4**

**Method of Moments Model Details for Directional Antenna- KZSF**

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 pattern. The following pages contain details of the method of moments models of the directional antenna patterns.

| Tower | Wire | Base Node |
|---|---|---|
| 1 | 1 | 1 |
| 2 | 2 | 21 |
| 3 | 3 | 41 |
| 4 | 4 | 61 |

## KZSF Driven Array

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KZSF 1370 San Jose

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

| wire | caps | Distance | Angle | Z | radius | segs |
|---|---|---|---|---|---|---|
| 1 | none | 0 | 0 | 0 | .218 | 20 |
| | | 0 | 0 | 104.9 | | |
| 2 | none | 123.3 | 61. | 0 | .218 | 20 |
| | | 123.3 | 61. | 105.3 | | |
| 3 | none | 82.2 | 341. | 0 | .218 | 20 |
| | | 82.2 | 341. | 105.3 | | |
| 4 | none | 91.3 | 251. | 0 | .218 | 20 |
| | | 91.3 | 251. | 107.2 | | |

Number of wires = 4
current nodes = 80

| | minimum | | maximum | |
|---|---|---|---|---|
| Individual wires | wire | value | wire | value |
| segment length | 1 | 5.245 | 4 | 5.36 |
| radius | 1 | .218 | 1 | .218 |

ELECTRICAL DESCRIPTION
Frequencies (MHz)

| | frequency | | no. of | segment length (wavelengths) | |
|---|---|---|---|---|---|
| no. | lowest | step | steps | minimum | maximum |
| 1 | 1.37 | 0 | 1 | .0145694 | .0148889 |

Sources

| source | node | sector | magnitude | phase | type |
|---|---|---|---|---|---|
| 1 | 1 | 1 | 770.556 | 67.6 | voltage |
| 2 | 21 | 1 | 353.877 | 143.6 | voltage |
| 3 | 41 | 1 | 626.65 | 325.6 | voltage |
| 4 | 61 | 1 | 1,358.12 | 304.3 | 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 | | | | | | | |
| 1.37 | 40.725 | 80.215 | 89.961 | 63.1 | 5.0022 | -3.5202 | -2.554 |

```
source =  2; node 21, sector 1
1.37     39.869   97.396   105.24   67.7      6.66     -2.6283  -3.4292

source =  3; node 41, sector 1
1.37     175.86   158.25   236.58   42.       6.4955   -2.6959  -3.3493

source =  4; node 61, sector 1
1.37     143.77   170.61   223.11   49.9      7.1321   -2.4519  -3.6513


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Analysis\kzsf-1Edriven  06-11-2012   15:03:13

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 | 6.05668 | 4.5 | 6.0376 | .48044 |
| 2 | 0 | 0 | 5.245 | 6.33835 | 3.2 | 6.32859 | .351683 |
| 3 | 0 | 0 | 10.49 | 6.47018 | 2.4 | 6.4646 | .268739 |
| 4 | 0 | 0 | 15.735 | 6.53119 | 1.7 | 6.52819 | .19781 |
| 5 | 0 | 0 | 20.98 | 6.53032 | 1.2 | 6.52892 | .135268 |
| 6 | 0 | 0 | 26.225 | 6.47181 | .7 | 6.47132 | .0796726 |
| 7 | 0 | 0 | 31.47 | 6.3582 | .3 | 6.35812 | .0304279 |
| 8 | 0 | 0 | 36.715 | 6.19154 | 359.9 | 6.19153 | -.012711 |
| 9 | 0 | 0 | 41.96 | 5.97379 | 359.5 | 5.97358 | -.0498278 |
| 10 | 0 | 0 | 47.205 | 5.70696 | 359.2 | 5.70638 | -.0809256 |
| 11 | 0 | 0 | 52.45 | 5.3932 | 358.9 | 5.39216 | -.105971 |
| 12 | 0 | 0 | 57.695 | 5.03484 | 358.6 | 5.03329 | -.124913 |
| 13 | 0 | 0 | 62.94 | 4.63433 | 358.3 | 4.63228 | -.137701 |
| 14 | 0 | 0 | 68.185 | 4.19419 | 358. | 4.1917 | -.144285 |
| 15 | 0 | 0 | 73.43 | 3.71693 | 357.8 | 3.71412 | -.14462 |
| 16 | 0 | 0 | 78.675 | 3.20488 | 357.5 | 3.20188 | -.138658 |
| 17 | 0 | 0 | 83.92 | 2.65982 | 357.3 | 2.65681 | -.126332 |
| 18 | 0 | 0 | 89.165 | 2.08232 | 357. | 2.07954 | -.107509 |
| 19 | 0 | 0 | 94.41 | 1.46994 | 356.8 | 1.46766 | -.0818646 |
| 20 | 0 | 0 | 99.655 | .812469 | 356.6 | .811017 | -.0485529 |
| END | 0 | 0 | 104.9 | 0 | 0 | 0 | 0 |
| GND | 59.777 | -107.841 | 0 | 2.37769 | 75.8 | .58211 | 2.30533 |
| 22 | 59.777 | -107.841 | 5.265 | 2.51359 | 74.5 | .671842 | 2.42214 |
| 23 | 59.777 | -107.841 | 10.53 | 2.58091 | 73.7 | .723215 | 2.47751 |
| 24 | 59.777 | -107.841 | 15.795 | 2.61735 | 73.1 | .760501 | 2.50443 |
| 25 | 59.777 | -107.841 | 21.06 | 2.6272 | 72.6 | .786402 | 2.50674 |
| 26 | 59.777 | -107.841 | 26.325 | 2.61242 | 72.1 | .80205 | 2.48625 |
| 27 | 59.777 | -107.841 | 31.59 | 2.57417 | 71.7 | .808018 | 2.44407 |
| 28 | 59.777 | -107.841 | 36.855 | 2.51334 | 71.3 | .804667 | 2.38105 |
| 29 | 59.777 | -107.841 | 42.12 | 2.43076 | 71. | .792264 | 2.29803 |
| 30 | 59.777 | -107.841 | 47.385 | 2.32727 | 70.7 | .771044 | 2.19584 |
| 31 | 59.777 | -107.841 | 52.65 | 2.20376 | 70.3 | .74126 | 2.07535 |
| 32 | 59.777 | -107.841 | 57.915 | 2.06118 | 70.1 | .703171 | 1.93753 |
| 33 | 59.777 | -107.841 | 63.18 | 1.90053 | 69.8 | .657045 | 1.78335 |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| 34 | 59.777 | -107.841 | 68.445 | 1.72287 | 69.5 | .60317 | 1.61383 |
| 35 | 59.777 | -107.841 | 73.71 | 1.52919 | 69.2 | .541834 | 1.42998 |
| 36 | 59.777 | -107.841 | 78.975 | 1.32048 | 69. | .473299 | 1.23274 |
| 37 | 59.777 | -107.841 | 84.24 | 1.09745 | 68.8 | .397748 | 1.02283 |
| 38 | 59.777 | -107.841 | 89.505 | .860323 | 68.5 | .315183 | .800509 |
| 39 | 59.777 | -107.841 | 94.77 | .608091 | 68.3 | .225133 | .56488 |
| 40 | 59.777 | -107.841 | 100.035 | .336505 | 68. | .125896 | .312067 |
| END | 59.777 | -107.841 | 105.3 | 0 | 0 | 0 | 0 |
| GND | 77.7216 | 26.7617 | 0 | 1.873 | 283.6 | .441601 | -1.8202 |
| 42 | 77.7216 | 26.7617 | 5.265 | 2.0596 | 278. | .286499 | -2.03957 |
| 43 | 77.7216 | 26.7617 | 10.53 | 2.16981 | 275. | .187984 | -2.16166 |
| 44 | 77.7216 | 26.7617 | 15.795 | 2.24872 | 272.7 | .105232 | -2.24626 |
| 45 | 77.7216 | 26.7617 | 21.06 | 2.30033 | 270.8 | .0338277 | -2.30009 |
| 46 | 77.7216 | 26.7617 | 26.325 | 2.32625 | 269.3 | -.0280179 | -2.32609 |
| 47 | 77.7216 | 26.7617 | 31.59 | 2.32724 | 268. | -.0810868 | -2.32582 |
| 48 | 77.7216 | 26.7617 | 36.855 | 2.3038 | 266.9 | -.125763 | -2.30036 |
| 49 | 77.7216 | 26.7617 | 42.12 | 2.25642 | 265.9 | -.162259 | -2.25058 |
| 50 | 77.7216 | 26.7617 | 47.385 | 2.18565 | 265. | -.190715 | -2.17731 |
| 51 | 77.7216 | 26.7617 | 52.65 | 2.0921 | 264.2 | -.211253 | -2.08141 |
| 52 | 77.7216 | 26.7617 | 57.915 | 1.97651 | 263.5 | -.223997 | -1.96378 |
| 53 | 77.7216 | 26.7617 | 63.18 | 1.8397 | 262.8 | -.229094 | -1.82538 |
| 54 | 77.7216 | 26.7617 | 68.445 | 1.68255 | 262.3 | -.226711 | -1.66721 |
| 55 | 77.7216 | 26.7617 | 73.71 | 1.50596 | 261.7 | -.217034 | -1.49024 |
| 56 | 77.7216 | 26.7617 | 78.975 | 1.31079 | 261.2 | -.200247 | -1.2954 |
| 57 | 77.7216 | 26.7617 | 84.24 | 1.09767 | 260.7 | -.176512 | -1.08339 |
| 58 | 77.7216 | 26.7617 | 89.505 | .866765 | 260.3 | -.1459 | -.854398 |
| 59 | 77.7216 | 26.7617 | 94.77 | .616951 | 259.9 | -.10823 | -.607383 |
| 60 | 77.7216 | 26.7617 | 100.035 | .343766 | 259.5 | -.062659 | -.338007 |
| END | 77.7216 | 26.7617 | 105.3 | 0 | 0 | 0 | 0 |
| GND | -29.7244 | 86.3258 | 0 | 4.30439 | 254.4 | -1.15479 | -4.14659 |
| 62 | -29.7244 | 86.3258 | 5.36 | 4.76315 | 249.8 | -1.64421 | -4.47037 |
| 63 | -29.7244 | 86.3258 | 10.72 | 5.02907 | 247.3 | -1.93851 | -4.64044 |
| 64 | -29.7244 | 86.3258 | 16.08 | 5.21721 | 245.5 | -2.16752 | -4.74565 |
| 65 | -29.7244 | 86.3258 | 21.44 | 5.33898 | 243.9 | -2.34555 | -4.79615 |
| 66 | -29.7244 | 86.3258 | 26.8 | 5.3991 | 242.7 | -2.47859 | -4.79655 |
| 67 | -29.7244 | 86.3258 | 32.16 | 5.39997 | 241.6 | -2.56951 | -4.74945 |
| 68 | -29.7244 | 86.3258 | 37.52 | 5.3432 | 240.6 | -2.61996 | -4.65678 |
| 69 | -29.7244 | 86.3258 | 42.88 | 5.23027 | 239.8 | -2.63115 | -4.52026 |
| 70 | -29.7244 | 86.3258 | 48.24 | 5.0627 | 239. | -2.60411 | -4.3416 |
| 71 | -29.7244 | 86.3258 | 53.6 | 4.84221 | 238.4 | -2.53987 | -4.12263 |
| 72 | -29.7244 | 86.3258 | 58.96 | 4.5707 | 237.7 | -2.43952 | -3.86524 |
| 73 | -29.7244 | 86.3258 | 64.32 | 4.2503 | 237.2 | -2.30424 | -3.57149 |
| 74 | -29.7244 | 86.3258 | 69.68 | 3.88325 | 236.6 | -2.13531 | -3.24347 |
| 75 | -29.7244 | 86.3258 | 75.04 | 3.47186 | 236.1 | -1.934 | -2.88331 |
| 76 | -29.7244 | 86.3258 | 80.4 | 3.01832 | 235.7 | -1.70157 | -2.49297 |
| 77 | -29.7244 | 86.3258 | 85.76 | 2.52434 | 235.2 | -1.43898 | -2.07404 |
| 78 | -29.7244 | 86.3258 | 91.12 | 1.99054 | 234.8 | -1.14655 | -1.62717 |
| 79 | -29.7244 | 86.3258 | 96.48 | 1.41459 | 234.4 | -.822853 | -1.15065 |
| 80 | -29.7244 | 86.3258 | 101.84 | .786609 | 234. | -.461924 | -.636694 |
| END | -29.7244 | 86.3258 | 107.2 | 0 | 0 | 0 | 0 |

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Analysis\kzsf-1Edriven 06-11-2012 13:13:53

CURRENT MOMENTS(amp-degrees) rms

Frequency = 1.37 MHz
Input power = 5,000. watts

| | | | vertical current moment | |
|---|---|---|---|---|
| wire | magnitude | phase (deg) | magnitude | phase (deg) |
| 1 | 418.201 | 360. | 418.201 | 360. |
| 2 | 170.208 | 71.4 | 170.208 | 71.4 |
| 3 | 155.153 | 267.4 | 155.153 | 267.4 |
| 4 | 365.925 | 241. | 365.925 | 241. |

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

| tower | magnitude | phase (deg) |
|---|---|---|
| 1 | 418.201 | 360. |
| 2 | 170.208 | 71.4 |
| 3 | 155.153 | 267.4 |
| 4 | 365.925 | 241. |

Tower 2(E) parameters normalized 0.407 / +71.4
Tower 3(N) parameters normalized 0.371 / -92.6
Tower 4(W) parameters normalized 0.875 / -119.0

**Item 5**

**Summary of Post Construction Certified Array Geometry- KZSF**

Because the KZSF antenna system was previously licensed and there has been no change in the theoretical antenna parameters, a post-construction survey is not required per the FCC Public Notice DA 09-2340. (October 29, 2009)

**Item 6**

**Sampling System Measurements - KZSF**

Impedance measurements were made of the antenna monitor sampling system using an AIM 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 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 below 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 ratioing the carrier frequency to the resonant frequency.

| Tower | Sampling Line Open-Circuited Resonance (kHz) | Sampling Line Electrical Length at 1370 kHz Degrees | 1370 kHz Measured Impedance with Sample Transformer Connected |
|---|---|---|---|
| 1 | 1115.025 | 331.74 | 51.8 $\pm$ j0 |
| 2 | 1115.40 | 331.63 | 51.4 -j0.5 |
| 3 | 1117.45 | 331.02 | 51.5 -j0.2 |
| 4 | 1115.75 | 331.53 | 50.4 -j0.7 |

The sampling line lengths meet the requirement that they be equal in length 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:

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

| Tower | -45° Offset Frequency (kHz) | -45° Measured Impedance (Ohms) | +45° Offset Frequency (kHz) | +45° Measured Impedance (Ohms) | Calculated Characteristic Impedance (Ohms) |
|---|---|---|---|---|---|
| 1 | 929.19 | 6.47 -j 49.48 | 1300.86 | 9.36 +j50.25 | 50.50 |
| 2 | 929.50 | 5.65 -j 49.64 | 1301.30 | 8.42 +j50.85 | 50.37 |
| 3 | 931.208 | 5.85 -j 49.48 | 1303.69 | 8.74+j49.86 | 50.21 |
| 4 | 929.79 | 5.67 -j 49.73 | 1301.71 | 8.39 +j50.24 | 50.49 |

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

**Item 7**

**Reference Field Strength Measurements - KZSF**

Reference field strength measurements were made along radials at the azimuths with radiation value limits specified on the station license and, additionally, on the radial of the line of the towers in the maximum. The transmitter power was at 5.4 kW (antenna common point current 10.4 Amps) for these measurements.

Measurements were made using a Potomac Instruments field strength meter, model FIM-41.

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

# KZSF, San Jose

## 1370 kHz - 5000 Watts; DA-1

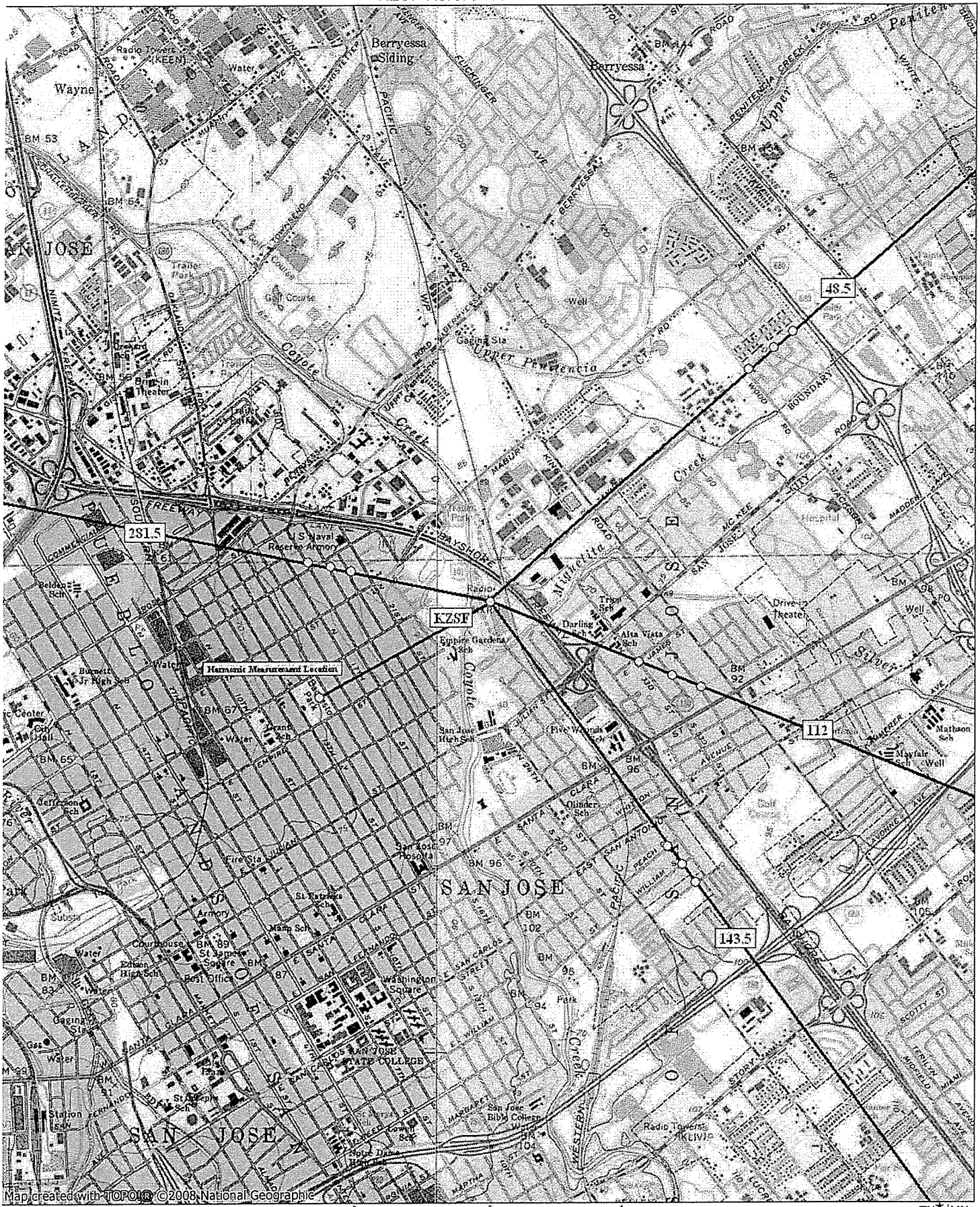
**Reference Field Strength Measurements**

| Radial | Point | Distance (km) | Field (mv/m) | Coordinates (NAD 83) | | Description |
|---|---|---|---|---|---|---|
| 48.5 | 1 | 2.09 | 60 | 37° 22.219 | 121° 51.279 | 2303 Ashland |
| | 2 | 2.29 | 52 | 37° 22.281 | 121° 51.187 | 584 Breezyglen |
| | 3 | 2.45 | 54 | 37° 22.328 | 121° 51.115 | 2459 Threadway Drive |
| 112 | 1 | .97 | 138 | 37° 21.232 | 121° 51.710 | 119 33rd Street |
| | 2 | 1.16 | 155 | 37° 21.198 | 121° 51.583 | 78 Eastwood |
| | 3 | 1.37 | 224 | 37° 21.117 | 121° 51.481 | 40 34th Street |
| 143.5 | 1 | 1.81 | 44 | 37° 20.661 | 121° 51.603 | 1365 Peach |
| | 2 | 1.95 | 24 | 37° 20.609 | 121° 51.547 | 1341 Williams |
| | 3 | 2.09 | 41 | 37° 20.545 | 121° 51.489 | 1371 Sunny Court |
| 281.5 | 1 | .87 | 740 | 37° 21.542 | 121° 52.913 | 744 20th Street |
| | 2 | .99 | 800 | 37° 21.553 | 121° 53.001. | 779 19th Street |
| | 3 | 1.13 | 450 | 37° 21.575 | 121° 53.088 | N.E Corner 18th & East Mission |

Measurements were made August 30, 2012 by Robert F. Turner

Potomac Instruments FIM-41, SN 1205 calibrated 16 July, 1999.

# KZSF Reference Points DA-1



**Item 8**

**Direct Measurement of Power - KZSF**

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 impedance measured at this point was adjusted to a value of 50 +/- j0.

**Item 9**

**Antenna Monitor and Sampling System - KZSF**

The antenna monitor is a Potomac Instruments model AM-1901. The sample transformers are connected through equal lengths of ⅜ inch foam heliax solid outer conductor transmission lines (Andrew LDF cable) to the antenna monitor. The two sample lines are routed to the towers such that they are subject to similar environmental conditions.

The antenna monitor was checked by placing the amplified network analyzer output through a sample transformer. A "T" connector was placed on the tower 1 sample transformer and the two outputs of the "T" were fed into the antenna monitor inputs 1 & 2. Both inputs read 0 degrees and a ratio of 100.

The sample transformers were tested by feeding their outputs configured as described above into the A and B inputs of the network analyzer.

All transformers TCT-1 0.5 V/A

| | | | | |
|---|---|---|---|---|
| Serial # | 889 | 15708 | 586 | 1168 |
| Magnitude | 1.0067 | 1.0049 | 1.0061 | reference |
| Phase | +0.625 | +0.456 | +0.672 | reference |

These values are well within the manufacturer's rated tolerance of +/- 2% amplitude and +/- 2 degrees phase.

## Harmonic Measurement Field Worksheet

| Station 1 | KZSF | Frequency | 1370 | KHz | Power | 5000 | Mode | DA-1 |
|---|---|---|---|---|---|---|---|---|
| Station 2 | KSJX | Frequency | 1500 | KHz | Power | 10000 | Mode | DA-D |
| Date | 08/30/12 | Time | 8:15 AM | Station 1 Field Strength | | | 900 | mV/m |

| Harmonic Calculations | | | Notes | Reading in mV/m | Value | FCC Limit | |
|---|---|---|---|---|---|---|---|
| 1 | F1 + F2 | 2870 | | 0.040 | -87.0 | -80 | dBc |
| 2 | F1 + 2(F2) | 4370 | | 0.035 | -88.2 | -80 | dBc |
| 3 | F2 + 2(F1) | 4240 | | 0.010 | -99.1 | -80 | dBc |
| 4 | 2(F1) - F2 | 1240 | 2 | | | -80 | dBc |
| 5 | 2(F2) | 3000 | | 0.025 | -91.1 | -80 | dBc |
| 6 | 2(F2) - F1 | 1630 | | 0.013 | -96.8 | -80 | dBc |
| 7 | 2(F1) - 2(F2) | -260 | 1 | | | -80 | dBc |
| 8 | 2(F1) + 2(F2) | 5740 | 1 | | | -80 | dBc |
| 9 | 2(F1) | 2740 | | 0.030 | -89.5 | -80 | dBc |
| 10 | 3(F1) | 4110 | | 0.010 | -99.1 | -80 | dBc |
| 11 | 3(F1)-F2 | 2610 | | 0.017 | -94.5 | -80 | dBc |
| 12 | 3(F2) | 4500 | | 0.013 | -96.8 | -80 | dBc |
| 13 | 3(F2)-F1 | 3130 | | 0.015 | -95.6 | -80 | dBc |
| 14 | 3(F1)-(2)F2 | 1110 | 2 | | | -80 | dBc |
| 15 | 3(F2)-(2)F1 | 1760 | | 0.020 | -93.1 | -80 | dBc |

| | |
|---|---|
| 1 | Frequency exceeds FIM capabilities |
| 2 | Frequency cannot be measured/Other station present |
| 3 | No Signal Present |

Measurement Location: GPS: 37° 21.151 / 121° 53.017 - East side of Bakesto Park. Approximately 0.75 miles from KZSF at 243-degrees true.

## Harmonic Measurement Field Worksheet

| Station 1 | KZSF | Frequency | 1370 | KHz | Power | 5000 | Mode | DA-1 |
|---|---|---|---|---|---|---|---|---|
| Station 2 | KSJX | Frequency | 1500 | KHz | Power | 5000 | Mode | DA-N |
| Date | 09/18/12 | Time | 10:30 AM | Station 1 Field Strength | | | 900 | mV/m |

| | Harmonic Calculations | | Notes | Reading in mV/m | Value | FCC Limit | |
|---|---|---|---|---|---|---|---|
| 1 | F1 + F2 | 2870 | | 0.050 | -85.1 | -80 | dBc |
| 2 | F1 + 2(F2) | 4370 | | 0.019 | -93.5 | -80 | dBc |
| 3 | F2 + 2(F1) | 4240 | | 0.040 | -87.0 | -80 | dBc |
| 4 | 2(F1) - F2 | 1240 | 2 | | | -80 | dBc |
| 5 | 2(F2) | 3000 | | 0.018 | -94.0 | -80 | dBc |
| 6 | 2(F2) - F1 | 1630 | | 0.016 | -95.0 | -80 | dBc |
| 7 | 2(F1) - 2(F2) | -260 | 1 | | | -80 | dBc |
| 8 | 2(F1) + 2(F2) | 5740 | 1 | | | -80 | dBc |
| 9 | 2(F1) | 2740 | | 0.027 | -90.5 | -80 | dBc |
| 10 | 3(F1) | 4110 | | 0.016 | -95.0 | -80 | dBc |
| 11 | 3(F1)-F2 | 2610 | | 0.026 | -90.8 | -80 | dBc |
| 12 | 3(F2) | 4500 | | 0.014 | -96.2 | -80 | dBc |
| 13 | 3(F2)-F1 | 3130 | | 0.024 | -91.5 | -80 | dBc |
| 14 | 3(F1)-(2)F2 | 1110 | 2 | | | -80 | dBc |
| 15 | 3(F2)-(2)F1 | 1760 | | 0.022 | -92.2 | -80 | dBc |

| | |
|---|---|
| 1 | Frequency exceeds FIM capabilities |
| 2 | Frequency cannot be measured/Other station present |
| 3 | No Signal Present |

Measurement Location: GPS: 37° 21.151 / 121° 53.017 - East side of Bakesto Park. Approximately 0.75 miles from KZSF at 243-degrees true.

**APPENDIX A:** **License Document BL-950203AA**

**APPENDIX B:** **FCC Form 302-AM**

FCC Form 352
May 1988

UNITED STATES OF AMERICA
FEDERAL COMMUNICATIONS COMMISSION

File No. : BL-950203AA

# AM BROADCAST STATION LICENSE

Call Sign : KKSJ

LICENSEE: United Broadcasting Company

1. Community of License. . . : San Jose, CA

2. Transmitter location..... : 501 Wooster Street
San Jose, CA

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

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

4. Main Studio Location: *(See Section 73.1125)*
399 3rd Street
Campbell, CA

5. Remote control location
399 3rd Street
Campbell, CA

6. Antenna and ground system:
Attached

7. Obstruction marking and lighting specifications - FCC Form 715, paragraphs: 1, 3, 12 & 21 for tower #2; 1, 3, 11 & 21 for towers #1, 3 & 4

8. Frequency..... : 1370 kHz

9. Nominal power (kW)..... : 5.0 Day 5.0 Night

Antenna input power (kW):

5.4 Day ☐ Non-directional antenna: current 10.2 amperes: resistance 52 ohms.
☑ Directional antenna :

5.4 Night ☐ Non-directional antenna: current 10.2 amperes: resistance 52 ohms.
☑ Directional antenna :

10. Hours of operation : BP-931008AB

11. Conditions..... : --

Subject to the provisions of the Communications Act of 1934, as amended, subsequent Acts, Treaties, and Commission rules made thereunder, and further subject to conditions set forth in this license,[1] the LICENSEE is hereby authorized to use and operate the radio transmitting apparatus herein described for the purpose of broadcasting for the term ending 3 A.M. Local Time
December 1, 1997

The Commission reserves the right during said license period of terminating this license or making effective any change, or modification of this license which may be necessary to comply with any decision of the Commission rendered as a result of any hearing held under the rules of the Commission prior to the commencement of this license period.

The license is issued on the licensee's representation that the statements contained in the licensee's application are true and that the undertakings therein contained so far as they are consistent herewith, will be carried out in good faith. The licensee shall, during the term of this license, render such broadcasting service as will serve the public interest, convenience or necessity to the full extent of the privileges herein conferred.

This license shall not vest in the licensee any right to operate the station nor any right in the use of the frequency designated in the license beyond the term hereof, nor in any other manner than authorized herein. Neither the license nor the right granted hereunder shall be assigned or otherwise transferred in violation of the Communications Act of 1934, as amended. This license is subject to the right of control by the Government of the United States conferred by section 606 of the Communications Act of 1934, as amended.

JAV:rao

[1] This license consists of this page and pages 2 & 3

Dated: JAN 22 1996

FEDERAL COMMUNICATIONS COMMISSION

FCC Form 353-A
June 1980

File No.: BL-950203AA **Call Sign:** KKSJ

1. **DESCRIPTION OF DIRECTIONAL ANTENNA SYSTEM**

**No. and Type of Elements:** Four (4) vertical, guyed, series excited, steel radiators of uniform cross section. Theoretical RMS: (day & night) 712 mV/m. Standard RMS: (day & night) 747.97 mV/m. Q (day & night) 22.36.

**Height above Insulators:** 59.4 m (97.8°)

**Overall Height:** 61 m

**Spacing and Orientation:** With tower #1 as reference, tower #2 is spaced 123.3° apart on a line bearing of 61.0° T; tower #3 is spaced 82.2° apart on a line bearing of 341.0° T; tower #4 is spaced 91.3° apart on a line bearing 251.0°T.

**Non-Directional Antenna:** None Authorized.

**Ground System consists of 120** equally spaced, buried, copper radials 60.96 m in length except where terminated by property boundaries or where intersecting radials are shortened and bonded, plus a 7.3 m x 7.3 m ground screen about the base of each tower.

2. **THEORETICAL SPECIFICATIONS**

| **Towers:** | | #1 | #2 | #3 | #4 |
|---|---|---|---|---|---|
| **Phasing:** | Day & Night | 0.0° | 71.4° | -119.0° | -92.6° |
| **Field Ratio:** | Day & Night: | 1.000 | 0.407 | 0.875 | 0.371 |

3. **OPERATING SPECIFICATIONS**

| | | | | | |
|---|---|---|---|---|---|
| **Phase Indication*:** | Day & Night: | 0.0° | 60.4° | -56.0° | -99.0° |
| **Antenna Base Current Ratio:** | Day & Night: | 1.000 | 0.337 | 0.242 | 0.632 |
| **Antenna Monitor Sample Current Ratio:** | Day & Night: | 1.000 | 0.310 | 0.220 | 0.626 |

* As indicated by Potomac Instruments AM-19 (204) Antenna Monitor.
Antenna sampling system approved under Section 73.68 (b) of the Rules.

File No: BL-950203AA Call Sign: KKSJ

**DESCRIPTION OF AND FIELD INTENSITY AT MONITORING POINTS:**

**Direction of 48.5° True North.** From the KKSJ transmitter site proceed on Eggo Way to Wooster St. at Julian St., which becomes Mc Kee Road. East of highway 101, turn left and proceed East for 6.7 miles to Toyon Avenue. Turn left and proceed 1.3 miles North along Toyon Avenue for 1.3 miles and take a right turn on Pepper Tree Lane. Go 0.8 miles to the monitor point which is in front of 4147 Pepper Tree at the Santa Clara County survey marker in the middle of the road. The distance is 5.5 km from the array center. The field intensity measured at this point should not exceed 5.5 mV/m.

**Direction of 112° True North.** From the 48.5° monitor point re-trace steps to highway 101, the Bayshore Freeway. Head southbound on 101 for 3.3 miles to Story Road. Head East on Story Road for 2.3 miles turning right onto Adrian Way. Turn left at 0.2 miles onto Amador Drive then turn right in another 0.2 miles onto Tallahassee Drive and drive 0.4 miles to Arden way. The monitor point is at the intersection of Tallahassee and Arden on the N.E. corner (Casell School). The distance is 4.06 km from the array center. The field intensity measured at this point should not exceed 73.2 mV/m.

**Direction of 143.5° True North.** From the 112° monitor point re-trace route to Story Road. Turn left and drive 3 miles and take a left turn onto McGlaughlin Avenue. Head South for 0.6 miles and turn left onto Camellian Drive. In 0.3 miles turn right onto Santee Drive. The monitor point is 0.2 miles down Santee at Tami Lee Drive at the south side of the street on the curb at 1360 Tammy Lee Drive. The distance is 4 km from the array center. The field intensity measured at this point should not exceed 24.8 mV/m.