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-20111024AJK

SECTION I - APPLICANT FEE INFORMATION

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

Entercom Communications Corp.

MAILING ADDRESS (Line 1) (Maximum 35 characters)
401 City Avenue

MAILING ADDRESS (Line 2) (Maximum 35 characters)
Suite 809

CITY	STATE OR COUNTRY (if foreign address)	ZIP CODE
Bala Cynwyd	PA	19004

TELEPHONE NUMBER (include area code)	CALL LETTERS	OTHER FCC IDENTIFIER (If applicable)
610-660-5652	KKSN	35033

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
M M R	0 0 0 1	$ 635	

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
M O R	0 0 0 1	$ 730	

	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	

SECTION II - APPLICANT INFORMATION

1. NAME OF APPLICANT
ENTERCOM PORTLAND LICENSE, LLC

MAILING ADDRESS
401 CITY AVENUE, SUITE 809

CITY	STATE	ZIP CODE
BALA CYNWYD	PA	19004

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
KKSN	VANCOUVER, WA	BP-20080715ACS	BMP-20101213AAR	11/7/2011

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 engineering report

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	
John C. Donlevie		
Title	Date	Telephone Number
Executive VP/Secretary	10/19/2011	610-660-5610

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
ENTERCOM PORTLAND LICENSE, 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
KKSN	BMP-20101213AAR	910	UNLIMITED	4.3	3.3

2. Station location	
State	City or Town
WASHINGTON	VANCOUVER

3. Transmitter location			
State	County	City or Town	Street address (or other identification)
OREGON	MULTNOMAH	PORTLAND	16899 NE CAMERON BLVD

4. Main studio location			
State	County	City or Town	Street address (or other identification)
OREGON	MULTNOMAH	PORTLAND	0700 SW BANCROFT ST.

5. Remote control point location (specify only if authorized directional antenna)			
State	County	City or Town	Street address (or other identification)
OREGON	MULTNOMAH	PORTLAND	0700 SW BANCROFT ST.

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
9.64	8.44
Measured antenna or common point resistance (in ohms) at operating frequency Night: 50.0 Day: 50.0	Measured antenna or common point reactance (in ohms) at operating frequency Night: +/-0.0 Day: +/-0.0

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 WEST	-137.0	0	0.711	1.0	NOT	NOT
2 CENTER	0	NOT USED	1.0	NOT USED	REQUIRED	REQUIRED
3 EAST	+125.0	210.0	0.609	0.390		

Manufacturer and type of antenna monitor: GORMAN-REDLICH CMR

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	ALL 82.3	ALL 83.2	ALL 83.8	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			
	45 °	33 '	31 "		122 °	28 '	57 "

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. Exhibit No. DNA

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
STL ANTENNA AND ISOCOUPLER ON #1 WEST TOWER
SEE ENG REPORT FOR ELECTRICAL EFFECT OF ISOCOUPLER
GROUND SYSTEM 120 RADIALS 270 FEET OR GREATER EXCEPT WHERE OVERLAPPING

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

NEW CONSTRUCTION
NOTE LATITUDE CHANGE OF ONE SECOND FROM AS BUILT SURVEY (DUE TO ROUNDING -ACTUAL CHANGE IS 0.6 SECONDS)

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) HATFIELD & DAWSON CONSULTING ENGINEERS 9500 GREENWOOD AVENUE NORTH SEATTLE, WA 98103	Date OCTOBER 17, 2011
	Telephone No. (Include Area Code) 206 783 9151

[ ] Technical Director
[X] Registered Professional Engineer
[ ] Chief Operator
[ ] Technical Consultant
[X] Other (specify) CONSULTING ENGINEER

HATFIELD & DAWSON
CONSULTING ELECTRICAL ENGINEERS
9500 GREENWOOD AVE. N.
SEATTLE, WASHINGTON 98103

BENJAMIN F. DAWSON III, PE
THOMAS M. ECKELS, PE
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JAMES B. HATFIELD, PE
CONSULTANT

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

Application for License to Cover Construction Permit

BMP-2010123AAR

KKSN (AM)

Vancouver, WA

910 kHz

3.3 kW Day, 4.3 kW Night DA-2

Entercom Portland License, LLC

October 2011

CARRIE A. WARD
ASSOCIATE COUNSEL

October 20, 2011

VIA OVERNIGHT DELIVERY
Federal Communications Commission
Media Bureau Services
P.O. Box 979089
St. Louis, MO 63197-9000

Re: KKSN(AM), Vancouver, WA
Facility Id. No. 35033

Dear Sir or Madam:

On behalf of Entercom Portland License, LLC, licensee of KKSN(AM) (Facility Id. No. 35033), enclosed in triplicate, is an application on FCC Form 302-AM requesting a license to cover BP-20080715ACS (as modified by BMP-20101213AAR). Enclosed also is a completed FCC Form 159 and a check payable to the FCC in the amount of $1,365.00 to cover the applicable filing fee.

The undersigned counsel is authorized to represent that neither the licensee nor any party holding an attributable interest in the licensee is subject to a denial of federal benefits under Section 5301 of the Anti-Drug Abuse Act of 1988, 21 U.S.C. §862.

If any information is desired in connection with this matter, please feel free to contact the undersigned. Kindly date stamp the enclosed "return copy" of this filing acknowledging its receipt by your office and return it to me in the enclosed self-addressed stamped envelope.

Sincerely,

Carrie Ward

Enclosure

cc: Erin Hubert
Gary Hilliard (KKSN(AM) Authorizations & Public File)

ENTERCOM COMMUNICATIONS CORP.
401 City Avenue, Suite 809, Bala Cynwyd, PA 19004 • (610) 660-5652 • Fax (610) 660-5527 • www.entercom.com
E-mail cward@entercom.com

APPLICATION FOR LICENSE

RADIO STATION KKSN-AM Vancouver, WA
910 kHz, 3.3 kW Day, 4.3 kW Night DA-2

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 Patterns
Item 5	Summary of Post Construction Certified Array Geometry
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	Intemodulation Considerations - Construction Permit Condition #3
Appendix A	Certified Post Construction Array Geometry Survey
Appendix B	Construction Permit BMP - 20101213AAR
Appendix C	FCC Form 302-AM

Purpose of Application

This engineering exhibit supports an application for license for the newly authorized directional antenna system for radio station KKSN, Vancouver, WA. KKSN will operate on 910 kHz with a daytime power of 3.3 kW and a nighttime power of 4.3 kW, with different directional patterns for day and night operation.

The KKSN move to this site was authorized by FCC construction permit number BMP - 20101213AAR.

The antenna towers and ground system were constructed in accordance with the terms of the construction permit and specifications that were provided in the application for construction permit.

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, Stephen Lockwood, PE, Thomas Gorton, PE, Benjamin F. Dawson, PE, and/or James Boyd.

Benjamin F. Dawson III, P.E.

Item 1

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

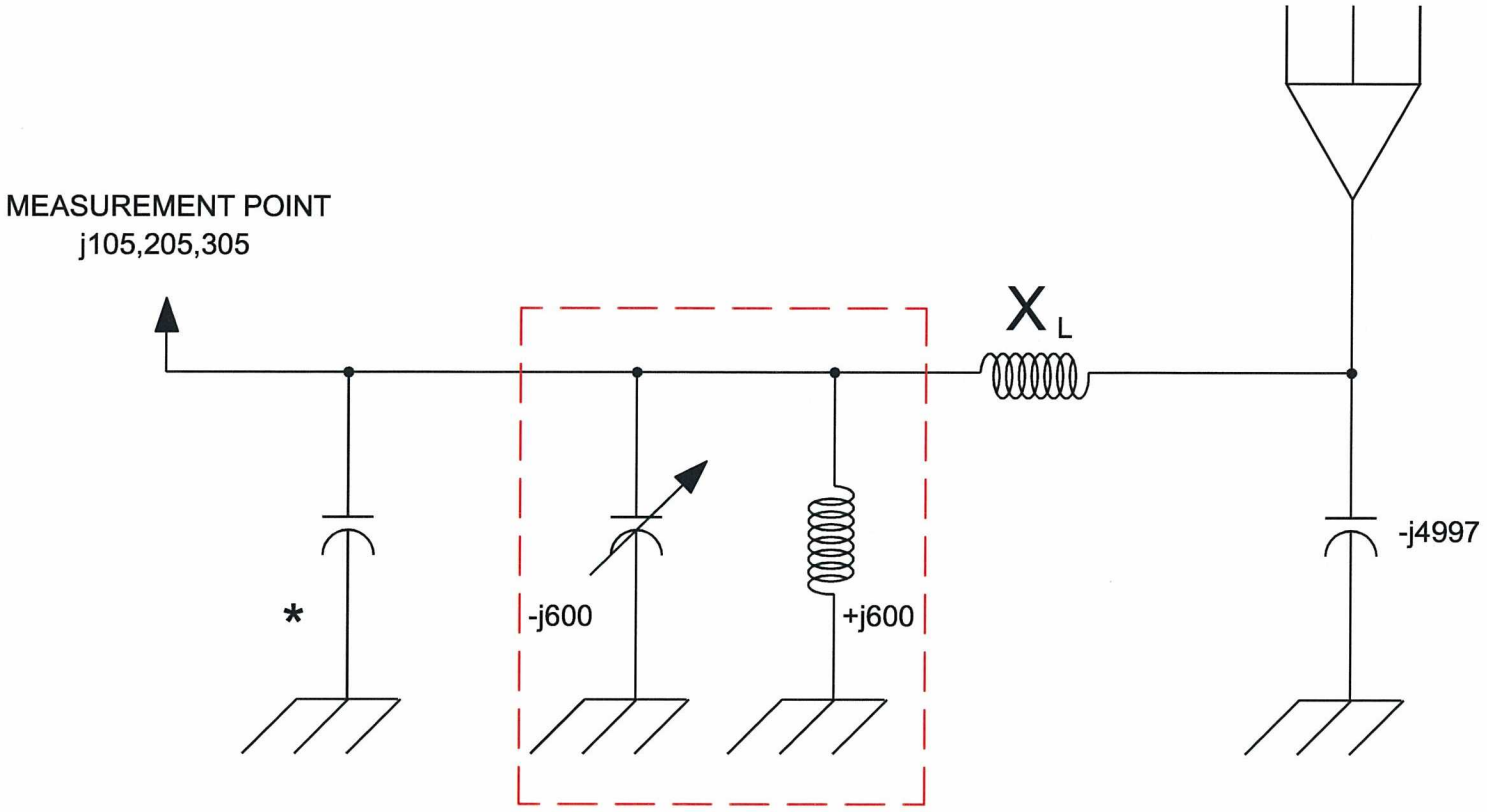
Tower base impedance measurements were made at the locations of the outputs of the antenna coupling units and diplexing filtering equipment using an HP-8753C network analyzer in a calibrated measurement system. The other towers were open circuited at the same point where impedance measurements were made (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. One of the towers has an isocoupler for an STL transmission line, and each tower has a parallel resonated isolation inductor for the sample line, and the manufacturer's or measured values of impedance for each were used in the models. Towers 1 and 3 each have a lighting isolation inductor, the effects of which were found to be negligible, and which are not included in the computation.

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

KKSN Tower Measurement Matrix

Tower #	R open	Hi Limit	Lo Limit	Xopen	Hi Limit	Lo Limit
1	43.3	47.032	39.568	78.1	83.224	72.976
2	42.1	45.784	38.416	71.7	76.568	66.832
3	42.1	45.784	38.416	80.1	85.304	74.896



SAMPLE ISOLATION INDUCTOR
AND RESONATING CAPACITOR

* ISOCOUPLER TOWER 1 ONLY -j5829

TOWER	X_L	"OPEN CIRCUT" LOAD Z	Z BASE MODELED	Z ATU MODELED	Z ATU MEASURED
1	+j45	-j2681	42.744 +j30.16	44.39 +j75.61	43.3 +j78.1
2	+j35	-j4997	43.075 +j37.96	43.73 +j72.85	42.1 +j71.7
3	+j50	-j4997	42.81 +j30.20	43.32 +j80.01	42.1 +j80.1

Bob Allen, H&D 10/14/2011 11:14 AM KKSN METHOD OF MOMENTS.dwg

Hatfield & Dawson
Consulting Engineers

ANALYSIS OF TOWER IMPEDANCE MEASUREMENTS TO VERIFY METHOD OF MOMENTS MODEL

RADIO STATION KKSN VANCOUVER, WA 10/2011

Item 2

Derivation of Operating Parameters for Directional Antenna - KKSN

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-one segments were used for each tower.

DAY PATTERN

Tower	Modeled Current Pulse	Current Magnitude	Current Phase	Antenna Monitor Ratio	Antenna Monitor Phase
1	8	7.2585	0.0°	1.0	0.0°
2	29	DETUNED			
3	50	2.8290	210°	0.390	-150.0°

NIGHT PATTERN

Tower	Modeled Current Pulse	Current Magnitude	Current Phase	Antenna Monitor Ratio	Antenna Monitor Phase
1	8	7.06444	-137.0	0.711	-137.0°
2	29	9.93465	0°	1.0	0°
3	50	6.05174	125.0°	0.609	125.0°

For the 21 segment moment method model, no segment elevation current magnitude values match the far field condition exactly for the night pattern. Analysis of models using other segment totals also resulted in essentially identical current ratios to the 21 segment model, but with current phase angles matching the far field pattern. The selection of segment 8 above the base of each tower was based, as shown the attached model data, on the basis of the elevation where the current is minimum with a tower of the modeled characteristics detuned for minimum horizontal plane radiation, as described in 73.151(c)(2)(I). The sample loops are therefore located at 90 feet above the base insulators.

Determination of Current Minimum for Detuned Condition

Elements of same geometry as impedance matrix moment method model, (91.5 and 93 degrees) with element two set for essentially zero field to determine proper reactance termination for detuned condition.

91.5 degree case

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

wire  caps Distance     Angle        Z            radius       segs
 1    none 0            0            0            .18           21
           0            0            91.5
 2    none 168.5        90.          0            .18           21
           168.5        90.          91.5

Number of wires          =  2
          current nodes  =  42

                         minimum                   maximum
Individual wires      wire    value             wire  value
segment length         1      4.35714            1    4.35714
radius                 1      .18                1    .18


ELECTRICAL DESCRIPTION
Frequencies (KHz)
     frequency                 no. of  segment length (wavelengths)
 no. lowest       step          steps   minimum        maximum
 1   910.         0              1      .0121032       .0121032

Sources
source node    sector  magnitude      phase          type
 1      1       1      359.231        38.7           voltage
 2      22      1      130.212        257.6          voltage

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IMPEDANCE
   normalization = 50.
freq     resist   react    imped    phase    VSWR    S11       S12
(KHz)    (ohms)   (ohms)   (ohms)   (deg)            dB        dB
source =  1; node 1, sector 1
910.     43.762   30.151   53.143   34.6     1.9096  -10.1     -.44663

source =  2; node 22, sector 1
910.     7.0502   -577.61  577.65   270.7    953.69  -1.8E-02 -23.783
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CURRENT rms
Frequency = 910 KHz
Input power = 1,000. watts
Efficiency = 100. %
coordinates in degrees

current no.	X	Y	Z	mag (amps)	phase (deg)	real (amps)	imaginary (amps)
GND	0	0	0	4.77985	4.1	4.76746	.343992
2	0	0	4.35714	4.83081	3.1	4.82396	.257047
3	0	0	8.71429	4.83587	2.3	4.8318	.198162
4	0	0	13.0714	4.80907	1.8	4.8068	.147807
5	0	0	17.4286	4.75247	1.2	4.75134	.103411
6	0	0	21.7857	4.66713	.8	4.66669	.0639595
7	0	0	26.1429	4.55386	.4	4.55376	.0289911
8	0	0	30.5	4.41342	360.	4.41342	-1.72E-03
9	0	0	34.8571	4.24663	359.6	4.24654	-.0282919
10	0	0	39.2143	4.05437	359.3	4.05405	-.0507796
11	0	0	43.5714	3.83756	359.	3.83693	-.0692141
12	0	0	47.9286	3.59721	358.7	3.59624	-.0836119
13	0	0	52.2857	3.3344	358.4	3.33308	-.0939859
14	0	0	56.6429	3.0502	358.1	3.04854	-.100348
15	0	0	61.	2.74569	357.9	2.74377	-.102711
16	0	0	65.3571	2.42187	357.6	2.41976	-.101088
17	0	0	69.7143	2.07958	357.4	2.07738	-.0954863
18	0	0	74.0714	1.71925	357.1	1.7171	-.0858916
19	0	0	78.4286	1.34057	356.9	1.33862	-.0722409
20	0	0	82.7857	.941351	356.7	.939781	-.0543435
21	0	0	87.1429	.514338	356.5	.513363	-.0316512
END	0	0	91.5	0	0	0	0
GND	0	-168.5	0	.159394	346.9	.155267	-.0360371
23	0	-168.5	4.35714	.119031	346.7	.115843	-.0273641
24	0	-168.5	8.71429	.0917198	346.5	.0891803	-.0214332
25	0	-168.5	13.0714	.0683916	346.2	.0664198	-.0163037
26	0	-168.5	17.4286	.0478505	345.8	.0463923	-.0117229
27	0	-168.5	21.7857	.0296235	345.1	.0286337	-7.59E-03
28	0	-168.5	26.1429	.0134991	343.3	.0129308	-3.88E-03
29	**0**	**-168.5**	**30.5**	**9.92E-04**	**213.8**	**-8.24E-04**	-5.52E-04
30	0	-168.5	34.8571	.0129106	169.4	-.0126893	2.38E-03
31	0	-168.5	39.2143	.0232242	167.8	-.0226972	4.92E-03
32	0	-168.5	43.5714	.0316652	167.1	-.0308683	7.06E-03
33	0	-168.5	47.9286	.0382419	166.7	-.0372179	8.79E-03
34	0	-168.5	52.2857	.0429641	166.4	-.0417591	.0101038
35	0	-168.5	56.6429	.0458423	166.1	-.044506	.0109882
36	0	-168.5	61.	.0468882	165.9	-.0454731	.0114322
37	0	-168.5	65.3571	.0461124	165.7	-.0446751	.0114233
38	0	-168.5	69.7143	.0435232	165.4	-.0421239	.0109474
39	0	-168.5	74.0714	.039119	165.2	-.0378227	9.99E-03
40	0	-168.5	78.4286	.0328759	165.	-.0317535	8.52E-03
41	0	-168.5	82.7857	.0247118	164.8	-.0238425	6.5E-03
42	0	-168.5	87.1429	.0143818	164.5	-.0138603	3.84E-03
END	0	-168.5	91.5	0	0	0	0

Element 2 Detuned with Conjugate Reactance

```
C:\Expert MBPro V.14\kksn#2 detuning 2  10-14-2011   12:04:46

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

wire  caps Distance     Angle        Z            radius       segs
 1    none 0            0            0            .18           21
           0            0            91.5
 2    none 168.5        90.          0            .18           21
           168.5        90.          91.5

Number of wires          =  2
          current nodes  =  42

                         minimum                   maximum
Individual wires      wire    value              wire  value
segment length         1      4.35714             1    4.35714
radius                 1      .18                 1    .18


ELECTRICAL DESCRIPTION
Frequencies (KHz)
     frequency                 no. of  segment length (wavelengths)
 no. lowest       step          steps   minimum        maximum
 1   910.         0              1      .0121032       .0121032

Sources
source node    sector  magnitude      phase          type
 1      1       1      359.231        38.7           voltage

Lumped loads
             resistance    reactance     inductance  capacitance passive
load  node   (ohms)        (ohms)        (mH)        (uF)        circuit
 1     22    0             577.61        0           0            0

C:\Expert MBPro V.14\kksn#2 detuning 2  10-14-2011   12:07:09

IMPEDANCE
   normalization = 50.
freq     resist   react    imped    phase    VSWR    S11      S12
(KHz)    (ohms)   (ohms)   (ohms)   (deg)            dB       dB
source =  1; node 1, sector 1
910.     43.768   30.147   53.146   34.6     1.9093  -10.102  -.44641


C:\Expert MBPro V.14\kksn#2 detuning 2  10-14-2011   12:07:09

CURRENT rms
Frequency   = 910 KHz
```

Input power = 1,000. watts
Efficiency = 100. %
coordinates in degrees

current no.	X	Y	Z	mag (amps)	phase (deg)	real (amps)	imaginary (amps)
GND	0	0	0	4.77992	4.1	4.76744	.345227
2	0	0	4.35714	4.83087	3.1	4.82396	.25828
3	0	0	8.71429	4.83592	2.4	4.83181	.199387
4	0	0	13.0714	4.80913	1.8	4.80682	.149017
5	0	0	17.4286	4.75252	1.3	4.75137	.104601
6	0	0	21.7857	4.66717	.8	4.66672	.0651216
7	0	0	26.1429	4.5539	.4	4.5538	.0301196
8	0	0	30.5	4.41346	360.	4.41346	-6.32E-04
9	0	0	34.8571	4.24667	359.6	4.24658	-.0272488
10	0	0	39.2143	4.0544	359.3	4.05409	-.0497878
11	0	0	43.5714	3.83758	359.	3.83697	-.0682789
12	0	0	47.9286	3.59724	358.7	3.59629	-.0827387
13	0	0	52.2857	3.33442	358.4	3.33312	-.0931792
14	0	0	56.6429	3.05021	358.1	3.04859	-.0996115
15	0	0	61.	2.7457	357.9	2.7438	-.10205
16	0	0	65.3571	2.42188	357.6	2.4198	-.100507
17	0	0	69.7143	2.07958	357.4	2.07741	-.0949895
18	0	0	74.0714	1.71927	357.2	1.71714	-.0854825
19	0	0	78.4286	1.34058	356.9	1.33865	-.0719228
20	0	0	82.7857	.941354	356.7	.939797	-.0541205
21	0	0	87.1429	.51434	356.5	.513373	-.0315296
END	0	0	91.5	0	0	0	0
GND	0	-168.5	0	.159273	347.6	.155562	-.0341772
23	0	-168.5	4.35714	.11894	347.6	.116174	-.0255001
24	0	-168.5	8.71429	.0916486	347.7	.0895331	-.019578
25	0	-168.5	13.0714	.0683365	347.8	.0667875	-.0144678
26	0	-168.5	17.4286	.0478102	348.	.0467705	-9.92E-03
27	0	-168.5	21.7857	.0295974	348.6	.0290181	-5.83E-03
28	0	-168.5	26.1429	.0134913	350.8	.0133175	-2.16E-03
29	**0**	**-168.5**	**30.5**	**1.19E-03**	**111.7**	**-4.39E-04**	**1.11E-03**
30	0	-168.5	34.8571	.0129342	162.1	-.0123096	3.97E-03
31	0	-168.5	39.2143	.0232349	163.9	-.0223265	6.43E-03
32	0	-168.5	43.5714	.0316688	164.5	-.0305102	8.49E-03
33	0	-168.5	47.9286	.0382407	164.6	-.0368757	.0101258
34	0	-168.5	52.2857	.0429596	164.7	-.0414363	.0113382
35	0	-168.5	56.6429	.0458357	164.7	-.0442058	.0121144
36	0	-168.5	61.	.0468803	164.6	-.0451988	.0124434
37	0	-168.5	65.3571	.0461042	164.5	-.0444296	.0123131
38	0	-168.5	69.7143	.0435152	164.4	-.0419101	.0117097
39	0	-168.5	74.0714	.0391119	164.3	-.0376437	.0106156
40	0	-168.5	78.4286	.03287	164.1	-.0316121	9.01E-03
41	0	-168.5	82.7857	.0247076	163.9	-.0237421	6.84E-03
42	0	-168.5	87.1429	.0143795	163.7	-.0138048	4.02E-03
END	0	-168.5	91.5	0	0	0	0

93 Degree Case

```
C:\Expert MBPro V.14\kksn#2 detuning 1b  10-14-2011   14:22:01

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

wire  caps Distance     Angle        Z            radius      segs
 1    none 0            0            0            .18          21
           0            0            91.5
 2    none 168.5        90.          0            .18          21
           168.5        90.          93.

Number of wires          =  2
           current nodes  =  42

                         minimum                   maximum
Individual wires      wire    value              wire  value
segment length         1      4.35714             2    4.42857
radius                 1      .18                 1    .18


ELECTRICAL DESCRIPTION
Frequencies (KHz)
     frequency                 no. of  segment length (wavelengths)
 no. lowest       step          steps   minimum         maximum
 1   910.         0              1      .0121032        .0123016

Sources
source node    sector  magnitude      phase          type
 1      1       1      359.222        38.7           voltage
 2      22      1      131.844        257.6          voltage

C:\Expert MBPro V.14\kksn#2 detuning 1b  10-14-2011   14:22:01

IMPEDANCE
   normalization = 50.
freq     resist   react    imped    phase    VSWR    S11      S12
(KHz)    (ohms)   (ohms)   (ohms)   (deg)            dB       dB
source =  1; node 1, sector 1
910.     43.761   30.15    53.142   34.6     1.9095  -10.1    -.44659

source =  2; node 22, sector 1
910.     7.2624   -569.62  569.66   270.7    900.56  -1.9E-02 -23.534


C:\Expert MBPro V.14\kksn#2 detuning 1b  10-14-2011   14:22:01

CURRENT rms
Frequency   = 910 KHz
Input power = 1,000. watts
Efficiency  = 100. %
coordinates in degrees
current                          mag      phase  real      imaginary
```

no.	X	Y	Z	(amps)	(deg)	(amps)	(amps)
GND	0	0	0	4.77983	4.1	4.76744	.343985
2	0	0	4.35714	4.83079	3.1	4.82395	.257041
3	0	0	8.71429	4.83584	2.3	4.83178	.198156
4	0	0	13.0714	4.80905	1.8	4.80678	.147802
5	0	0	17.4286	4.75244	1.2	4.75132	.103407
6	0	0	21.7857	4.6671	.8	4.66666	.0639555
7	0	0	26.1429	4.55382	.4	4.55373	.0289875
8	0	0	30.5	4.41339	360.	4.41339	-1.72E-03
9	0	0	34.8571	4.24661	359.6	4.24651	-.0282948
10	0	0	39.2143	4.05434	359.3	4.05402	-.0507822
11	0	0	43.5714	3.83753	359.	3.83691	-.0692164
12	0	0	47.9286	3.59719	358.7	3.59622	-.0836141
13	0	0	52.2857	3.33438	358.4	3.33305	-.0939873
14	0	0	56.6429	3.05018	358.1	3.04853	-.100349
15	0	0	61.	2.74567	357.9	2.74375	-.102712
16	0	0	65.3571	2.42185	357.6	2.41974	-.10109
17	0	0	69.7143	2.07956	357.4	2.07737	-.0954871
18	0	0	74.0714	1.71924	357.1	1.71709	-.0858924
19	0	0	78.4286	1.34056	356.9	1.33861	-.0722417
20	0	0	82.7857	.941344	356.7	.939774	-.0543438
21	0	0	87.1429	.514334	356.5	.513359	-.0316513
END	0	0	91.5	0	0	0	0
GND	0	-168.5	0	.163654	346.9	.159374	-.0371864
23	0	-168.5	4.42857	.122344	346.6	.11903	-.0282832
24	0	-168.5	8.85714	.0943179	346.4	.0916737	-.0221765
25	0	-168.5	13.2857	.0703569	346.1	.0683001	-.0168875
26	0	-168.5	17.7143	.0492426	345.7	.047718	-.0121584
27	0	-168.5	22.1429	.0304958	345.	.0294573	-7.89E-03
28	0	-168.5	26.5714	.0139044	343.1	.0133033	-4.04E-03
29	**0**	**-168.5**	**31.**	**1.04E-03**	**215.3**	**-8.51E-04**	**-6.03E-04**
30	0	-168.5	35.4286	.0132887	169.4	-.0130634	2.44E-03
31	0	-168.5	39.8571	.0239085	167.8	-.0233646	5.07E-03
32	0	-168.5	44.2857	.0326004	167.1	-.0317745	7.29E-03
33	0	-168.5	48.7143	.0393713	166.7	-.0383074	9.09E-03
34	0	-168.5	53.1429	.0442305	166.3	-.0429768	.0104564
35	0	-168.5	57.5714	.0471887	166.	-.0457967	.0113773
36	0	-168.5	62.	.0482579	165.8	-.0467825	.0118413
37	0	-168.5	66.4286	.0474499	165.6	-.0459502	.0118351
38	0	-168.5	70.8571	.0447739	165.3	-.0433131	.0113438
39	0	-168.5	75.2857	.0402305	165.1	-.0388765	.0103493
40	0	-168.5	79.7143	.0337966	164.9	-.0326238	8.83E-03
41	0	-168.5	84.1429	.0253908	164.6	-.0244823	6.73E-03
42	0	-168.5	88.5714	.014765	164.4	-.01422	3.97E-03
END	0	-168.5	93.	0	0	0	0

Element 2 Detuned with Conjugate Reactance

```
C:\Expert MBPro V.14\kksn#2 detuning 2a  10-14-2011   14:28:28

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

wire  caps Distance     Angle        Z            radius      segs
 1    none 0            0            0            .18          21
           0            0            91.5
 2    none 168.5        90.          0            .18          21
           168.5        90.          93.

Number of wires          =  2
           current nodes  =  42

                        minimum                   maximum
Individual wires      wire    value              wire  value
segment length         1      4.35714             2    4.42857
radius                 1      .18                 1    .18


ELECTRICAL DESCRIPTION
Frequencies (KHz)
     frequency                 no. of  segment length (wavelengths)
 no. lowest       step          steps   minimum        maximum
 1   910.         0              1      .0121032       .0123016

Sources
source node    sector  magnitude      phase          type
 1      1       1      359.231        38.7           voltage

Lumped loads
            resistance    reactance     inductance  capacitance passive
load  node  (ohms)        (ohms)        (mH)        (uF)        circuit
 1     22   0             569.62        0           0            0

C:\Expert MBPro V.14\kksn#2 detuning 2a  10-14-2011   14:28:28

IMPEDANCE
   normalization = 50.
freq     resist   react    imped    phase    VSWR    S11      S12
(KHz)    (ohms)   (ohms)   (ohms)   (deg)            dB       dB
source =  1; node 1, sector 1
910.     43.768   30.145   53.145   34.6     1.9092  -10.102  -.44636


C:\Expert MBPro V.14\kksn#2 detuning 2a  10-14-2011   14:28:28

CURRENT rms
Frequency   = 910 KHz
Input power = 1,000. watts
Efficiency  = 100. %
coordinates in degrees
```

current no.	X	Y	Z	mag (amps)	phase (deg)	real (amps)	imaginary (amps)
GND	0	0	0	4.77991	4.1	4.76742	.345369
2	0	0	4.35714	4.83086	3.1	4.82394	.258424
3	0	0	8.71429	4.8359	2.4	4.83178	.199531
4	0	0	13.0714	4.80911	1.8	4.80679	.14916
5	0	0	17.4286	4.7525	1.3	4.75135	.104741
6	0	0	21.7857	4.66715	.8	4.6667	.0652597
7	0	0	26.1429	4.55387	.4	4.55377	.0302541
8	0	0	30.5	4.41343	360.	4.41343	-5.02E-04
9	0	0	34.8571	4.24665	359.6	4.24656	-.0271236
10	0	0	39.2143	4.05437	359.3	4.05407	-.0496685
11	0	0	43.5714	3.83756	359.	3.83695	-.0681661
12	0	0	47.9286	3.59722	358.7	3.59627	-.0826333
13	0	0	52.2857	3.3344	358.4	3.3331	-.0930813
14	0	0	56.6429	3.0502	358.1	3.04857	-.0995227
15	0	0	61.	2.74569	357.9	2.74379	-.10197
16	0	0	65.3571	2.42187	357.6	2.41978	-.100437
17	0	0	69.7143	2.07957	357.4	2.0774	-.0949291
18	0	0	74.0714	1.71925	357.2	1.71713	-.0854321
19	0	0	78.4286	1.34057	356.9	1.33864	-.0718833
20	0	0	82.7857	.941349	356.7	.939794	-.0540931
21	0	0	87.1429	.514336	356.5	.51337	-.0315146
END	0	0	91.5	0	0	0	0
GND	0	-168.5	0	.163519	347.6	.159682	-.0352185
23	0	-168.5	4.42857	.122241	347.6	.119377	-.0263044
24	0	-168.5	8.85714	.094237	347.6	.092046	-.0202026
25	0	-168.5	13.2857	.0702947	347.7	.0686907	-.0149307
26	0	-168.5	17.7143	.0491969	348.	.0481215	-.0102302
27	0	-168.5	22.1429	.0304658	348.6	.0298687	-6.E-03
28	0	-168.5	26.5714	.0138946	350.9	.0137183	-2.21E-03
29	**0**	**-168.5**	**31.**	**1.25E-03**	**110.4**	**-4.37E-04**	**1.17E-03**
30	0	-168.5	35.4286	.0133149	161.9	-.0126541	4.14E-03
31	0	-168.5	39.8571	.0239205	163.7	-.0229643	6.7E-03
32	0	-168.5	44.2857	.0326046	164.3	-.0313872	8.83E-03
33	0	-168.5	48.7143	.0393701	164.5	-.037937	.0105257
34	0	-168.5	53.1429	.0442257	164.5	-.042627	.0117836
35	0	-168.5	57.5714	.0471816	164.5	-.0454711	.0125889
36	0	-168.5	62.	.0482493	164.5	-.0464847	.0129295
37	0	-168.5	66.4286	.0474408	164.4	-.0456834	.0127929
38	0	-168.5	70.8571	.0447652	164.2	-.0430807	.0121644
39	0	-168.5	75.2857	.0402226	164.1	-.0386817	.0110262
40	0	-168.5	79.7143	.0337901	163.9	-.0324699	9.35E-03
41	0	-168.5	84.1429	.0253861	163.8	-.024373	7.1E-03
42	0	-168.5	88.5714	.0147624	163.6	-.0141596	4.18E-03
END	0	-168.5	93.	0	0	0	0

Item 3
Method of Moments Model Details for Towers Driven Individually - KKSN

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 21 wire segments. As the towers are physically 89.9 degrees in electrical height, the segment length is 4.28 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 identical, uniform cross section towers having a face width of 18 inches, or an equivalent radius of 0.218 meters.

Tower	Physical Height (degrees)	Modeled Height (degrees)	Modeled Percentage of Height	Modeled Radius (meters)	Percent of Equivalent Radius
1, 3	89.9	91.5	101.78	0.18	82.5
2	89.9	93	103.44	0.18	82.5

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

Tower #2 Driven with Towers #1 and #3 Open

(Complete Printout of Summary Data from MININEC)

```
C:\Expert MBPro V.14\kksn#2  10-14-2011   11:37:48

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

wire  caps Distance     Angle        Z            radius      segs
 1    none 0            0            0            .18          21
           0            0            91.5
 2    none 84.3         90.          0            .18          21
           84.3         90.          93.
 3    none 168.5        90.          0            .18          21
           168.5        90.          91.5

Number of wires          =  3
           current nodes  =  63

                         minimum                   maximum
Individual wires       wire    value             wire  value
segment length          1      4.35714            2    4.42857
radius                  1      .18                1    .18


ELECTRICAL DESCRIPTION
Frequencies (KHz)
     frequency                no. of  segment length (wavelengths)
 no. lowest       step         steps   minimum        maximum
 1   910.         0             1      .0121032       .0123016

Sources
source node    sector  magnitude      phase          type
 1      22      1       1.             0              voltage

Lumped loads
             resistance    reactance     inductance  capacitance passive
load  node   (ohms)        (ohms)        (mH)        (uF)        circuit
 1     43    0             -4,997.       0           0            0
 2     1     0             -2,681.       0           0            0

C:\Expert MBPro V.14\kksn#2  10-14-2011   11:37:48

IMPEDANCE
   normalization = 50.
freq     resist   react    imped    phase    VSWR    S11      S12
(KHz)    (ohms)   (ohms)   (ohms)   (deg)            dB       dB
source =  1; node 22, sector 1
910.     43.075   37.935   57.398   41.4     2.245   -8.3208  -.69155


C:\Expert MBPro V.14\kksn#2  10-14-2011   11:37:48

CURRENT rms
```

Frequency = 910 KHz
Input power = 1,000. watts
Efficiency = 100. %
coordinates in degrees

current no.	X	Y	Z	mag (amps)	phase (deg)	real (amps)	imaginary (amps)
GND	0	0	0	.0550415	190.7	-.0540772	-.0102575
2	0	0	4.35714	.118886	190.8	-.116793	-.0222097
3	0	0	8.71429	.160115	190.8	-.157269	-.0300538
4	0	0	13.0714	.19328	190.9	-.189803	-.036497
5	0	0	17.4286	.220326	191.	-.216306	-.0418938
6	0	0	21.7857	.242048	191.	-.237563	-.0463815
7	0	0	26.1429	.258842	191.1	-.253963	-.050019
8	0	0	30.5	.270938	191.2	-.265737	-.0528327
9	0	0	34.8571	.278492	191.4	-.273041	-.0548309
10	0	0	39.2143	.281628	191.5	-.276001	-.0560134
11	0	0	43.5714	.280454	191.6	-.274729	-.0563752
12	0	0	47.9286	.275075	191.7	-.269334	-.0559072
13	0	0	52.2857	.265598	191.9	-.259925	-.0545999
14	0	0	56.6429	.252131	192.	-.246617	-.0524414
15	0	0	61.	.234783	192.2	-.229523	-.04942
16	0	0	65.3571	.213657	192.3	-.208751	-.0455214
17	0	0	69.7143	.18884	192.5	-.184396	-.0407295
18	0	0	74.0714	.160385	192.6	-.156515	-.0350194
19	0	0	78.4286	.128261	192.8	-.125088	-.0283505
20	0	0	82.7857	.0922437	192.9	-.089905	-.0206394
21	0	0	87.1429	.0515707	193.1	-.0502306	-.0116801
END	0	0	91.5	0	0	0	0
GND	0	-84.3	0	4.81823	318.6	3.61588	-3.18445
23	0	-84.3	4.42857	4.88662	317.6	3.60639	-3.29742
24	0	-84.3	8.85714	4.90277	316.9	3.57802	-3.35185
25	0	-84.3	13.2857	4.88458	316.3	3.53087	-3.37522
26	0	-84.3	17.7143	4.83465	315.8	3.46518	-3.3714
27	0	-84.3	22.1429	4.75426	315.3	3.3813	-3.34212
28	0	-84.3	26.5714	4.64436	314.9	3.27964	-3.28846
29	0	-84.3	31.	4.50581	314.5	3.16069	-3.21128
30	0	-84.3	35.4286	4.33946	314.2	3.02507	-3.11125
31	0	-84.3	39.8571	4.14626	313.9	2.87338	-2.98917
32	0	-84.3	44.2857	3.9272	313.6	2.70637	-2.84578
33	0	-84.3	48.7143	3.68339	313.3	2.52481	-2.68192
34	0	-84.3	53.1429	3.41595	313.	2.32953	-2.4984
35	0	-84.3	57.5714	3.12604	312.7	2.12134	-2.29609
36	0	-84.3	62.	2.81484	312.5	1.90109	-2.07586
37	0	-84.3	66.4286	2.48343	312.2	1.66954	-1.83849
38	0	-84.3	70.8571	2.13273	312.	1.42736	-1.58467
39	0	-84.3	75.2857	1.76327	311.8	1.17494	-1.31478
40	0	-84.3	79.7143	1.37481	311.6	.912162	-1.02862
41	0	-84.3	84.1429	.965193	311.4	.637684	-.724539
42	0	-84.3	88.5714	.527095	311.1	.34677	-.396962
END	0	-84.3	93.	0	0	0	0
GND	0	-168.5	0	.0292973	191.4	-.0287241	-5.77E-03
44	0	-168.5	4.35714	.0927031	191.4	-.0908785	-.0183021
45	0	-168.5	8.71429	.133802	191.4	-.131141	-.026555
46	0	-168.5	13.0714	.167034	191.5	-.163668	-.0333622
47	0	-168.5	17.4286	.194323	191.6	-.19035	-.0390953
48	0	-168.5	21.7857	.216458	191.7	-.21196	-.0438977

49	0	-168.5	26.1429	.233828	191.8	-.228883	-.0478317
50	0	-168.5	30.5	.246657	191.9	-.241343	-.0509239
51	0	-168.5	34.8571	.255098	192.	-.249492	-.053184
52	0	-168.5	39.2143	.259267	192.2	-.25345	-.054611
53	0	-168.5	43.5714	.259268	192.3	-.253323	-.0551995
54	0	-168.5	47.9286	.2552	192.4	-.249216	-.0549407
55	0	-168.5	52.2857	.247162	192.6	-.241231	-.0538234
56	0	-168.5	56.6429	.235257	192.7	-.229476	-.0518357
57	0	-168.5	61.	.219587	192.9	-.214058	-.0489656
58	0	-168.5	65.3571	.200249	193.	-.195081	-.0451984
59	0	-168.5	69.7143	.177324	193.2	-.172634	-.0405162
60	0	-168.5	74.0714	.150863	193.4	-.146772	-.0348952
61	0	-168.5	78.4286	.120836	193.5	-.117477	-.0282935
62	0	-168.5	82.7857	.0870302	193.7	-.0845506	-.0206266
63	0	-168.5	87.1429	.0487226	193.9	-.0472999	-.0116881
END	0	-168.5	91.5	0	0	0	0

Tower #1 Driven with Towers #2 and #3 Open
(Impedance Data Only)

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IMPEDANCE
normalization = 50.

freq (KHz)	resist (ohms)	react (ohms)	imped (ohms)	phase (deg)	VSWR	S11 dB	S12 dB
source = 1; node 1, sector 1							
910.	42.744	30.158	52.312	35.2	1.9328	-9.9498	-.46318

Tower #3 Driven with Towers #2 and #1 Open
(Impedance Data Only)

C:\Expert MBPro V.14\kksn#2 10-14-2011 11:41:53

IMPEDANCE
normalization = 50.

freq (KHz)	resist (ohms)	react (ohms)	imped (ohms)	phase (deg)	VSWR	S11 dB	S12 dB
source = 1; node 43, sector 1							
910.	42.805	30.204	52.389	35.2	1.9331	-9.9477	-.46342

Item 4

Method of Moments Model Details for Directional Antenna- KKSN

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	22
3	3	43

KKSN Day Driven Array

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

wire  caps Distance     Angle        Z            radius      segs
 1    none 0            0            0            .18          21
           0            0            91.5
 2    none 84.3         90.          0            .18          21
           84.3         90.          93.
 3    none 168.5        90.          0            .18          21
           168.5        90.          91.5

Number of wires          =  3
          current nodes  =  63

                         minimum                   maximum
Individual wires      wire    value              wire  value
segment length         1      4.35714             2    4.42857
radius                 1      .18                 1    .18


ELECTRICAL DESCRIPTION
Frequencies (KHz)
     frequency                 no. of  segment length (wavelengths)
 no. lowest       step          steps   minimum        maximum
 1   910.         0              1      .0121032       .0123016

Sources
source node    sector  magnitude      phase          type
 1      1       1      625.97         45.8           voltage
 2      43      1      443.227        253.1          voltage

Lumped loads
             resistance    reactance     inductance  capacitance passive
load  node   (ohms)        (ohms)        (mH)        (uF)        circuit
 1     22    0             579.          0           0            0

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IMPEDANCE
   normalization = 50.
freq     resist   react    imped    phase    VSWR    S11      S12
(KHz)    (ohms)   (ohms)   (ohms)   (deg)            dB       dB
source =  1; node 1, sector 1
910.     42.491   38.012   57.012   41.8     2.2652  -8.2351  -.70651

source =  2; node 43, sector 1
910.     88.638   62.436   108.42   35.2     2.8677  -6.3228  -1.1532
```

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CURRENT rms
Frequency = 910 KHz
Input power = 3,300. watts
Efficiency = 100. %
coordinates in degrees

current no.	X	Y	Z	mag (amps)	phase (deg)	real (amps)	imaginary (amps)
GND	0	0	0	7.76157	4.	7.74281	.539343
2	0	0	4.35714	7.87067	2.9	7.8603	.404032
3	0	0	8.71429	7.8961	2.3	7.88992	.312343
4	0	0	13.0714	7.86653	1.7	7.86305	.233885
5	0	0	17.4286	7.78619	1.2	7.78444	.164662
6	0	0	21.7857	7.65712	.8	7.65642	.103093
7	0	0	26.1429	7.48077	.4	7.48061	.048466
8	**0**	**0**	**30.5**	**7.2585**	**0.0**	**7.2585**	**4.29E-04**
9	0	0	34.8571	6.99176	359.7	6.99164	-.0411919
10	0	0	39.2143	6.68192	359.3	6.68148	-.0764836
11	0	0	43.5714	6.33055	359.	6.32967	-.105486
12	0	0	47.9286	5.93933	358.8	5.93795	-.12822
13	0	0	52.2857	5.51001	358.5	5.50811	-.144696
14	0	0	56.6429	5.04439	358.2	5.04201	-.154927
15	0	0	61.	4.54424	358.	4.54146	-.158923
16	0	0	65.3571	4.01123	357.8	4.00817	-.156696
17	0	0	69.7143	3.44671	357.5	3.44352	-.148244
18	0	0	74.0714	2.85144	357.3	2.84831	-.133534
19	0	0	78.4286	2.22484	357.1	2.22199	-.112456
20	0	0	82.7857	1.56329	356.9	1.56099	-.084698
21	0	0	87.1429	.854692	356.7	.853264	-.0493888
END	0	0	91.5	0	0	0	0
GND	0	-84.3	0	.27545	44.2	.197561	.191944
23	0	-84.3	4.42857	.204835	44.2	.146969	.142679
24	0	-84.3	8.85714	.157072	44.1	.112876	.109227
25	0	-84.3	13.2857	.116382	43.8	.0839578	.0805965
26	0	-84.3	17.7143	.0806757	43.3	.0587057	.0553372
27	0	-84.3	22.1429	.0491331	42.	.0365087	.0328812
28	0	-84.3	26.5714	.0214428	37.2	.0170729	.0129734
29	**0**	**-84.3**	**31.**	**4.52E-03**	**273.**	**2.34E-04**	**-4.51E-03**
30	0	-84.3	35.4286	.0241741	234.3	-.0141141	-.019626
31	0	-84.3	39.8571	.0415753	231.2	-.0260477	-.0324041
32	0	-84.3	44.2857	.055733	230.3	-.0356325	-.0428543
33	0	-84.3	48.7143	.0666481	229.9	-.0429301	-.0509802
34	0	-84.3	53.1429	.0743536	229.8	-.0480018	-.0567828
35	0	-84.3	57.5714	.0788899	229.8	-.0509114	-.0602631
36	0	-84.3	62.	.0803006	229.9	-.0517241	-.0614232
37	0	-84.3	66.4286	.0786299	230.	-.0505051	-.0602652
38	0	-84.3	70.8571	.0739167	230.2	-.0473156	-.0567884
39	0	-84.3	75.2857	.0661845	230.4	-.0422053	-.0509813
40	0	-84.3	79.7143	.0554179	230.6	-.0351978	-.0428049
41	0	-84.3	84.1429	.0415053	230.8	-.0262527	-.0321478
42	0	-84.3	88.5714	.0240633	231.	-.015157	-.0186898
END	0	-84.3	93.	0	0	0	0

GND	0	-168.5	0	2.88988	217.9	-2.27913	-1.77677
44	0	-168.5	4.35714	2.96271	215.8	-2.40329	-1.73258
45	0	-168.5	8.71429	2.99474	214.4	-2.47041	-1.69279
46	0	-168.5	13.0714	3.00306	213.3	-2.51015	-1.64849
47	0	-168.5	17.4286	2.98984	212.3	-2.52656	-1.59863
48	0	-168.5	21.7857	2.95604	211.5	-2.52145	-1.54288
49	0	-168.5	26.1429	2.90226	210.7	-2.49582	-1.48121
50	**0**	**-168.5**	**30.5**	**2.829**	**210.**	**-2.45041**	**-1.41377**
51	0	-168.5	34.8571	2.73675	209.3	-2.38584	-1.34075
52	0	-168.5	39.2143	2.62603	208.7	-2.30268	-1.26243
53	0	-168.5	43.5714	2.49742	208.2	-2.20154	-1.17912
54	0	-168.5	47.9286	2.35153	207.6	-2.08304	-1.09116
55	0	-168.5	52.2857	2.18903	207.2	-1.94781	-.99893
56	0	-168.5	56.6429	2.01058	206.7	-1.7965	-.902783
57	0	-168.5	61.	1.81687	206.2	-1.62974	-.803094
58	0	-168.5	65.3571	1.60855	205.8	-1.44815	-.700211
59	0	-168.5	69.7143	1.38614	205.4	-1.25222	-.59442
60	0	-168.5	74.0714	1.14992	205.	-1.04221	-.485912
61	0	-168.5	78.4286	.899628	204.6	-.817897	-.374667
62	0	-168.5	82.7857	.633768	204.2	-.577906	-.260166
63	0	-168.5	87.1429	.347389	203.9	-.317687	-.14055
END	0	-168.5	91.5	0	0	0	0

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CURRENT MOMENTS(amp-degrees) rms

Frequency = 910 KHz
Input power = 3,300. watts

			vertical current moment	
wire	magnitude	phase (deg)	magnitude	phase (deg)
1	640.781	0.0	640.781	0.0
2	.527774	318.6	.527774	318.6
3	249.546	210.	249.546	210.

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	640.781	0.0
2	.527774	318.6
3	249.546	210.

These current moment summations show the model produces the correct far-field amplitude and phase relationships, and that the #2 tower is properly detuned, with a far field contribution of less than 0.1% of that of the reference tower.

KKSN Night Driven Array

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

wire	caps	Distance	Angle	Z	radius	segs
1	none	0	0	0	.18	21
		0	0	91.5		
2	none	84.3	90.	0	.18	21
		84.3	90.	93.		
3	none	168.5	90.	0	.18	21
		168.5	90.	91.5		

Number of wires = 3
current nodes = 63

	minimum		maximum	
Individual wires	wire	value	wire	value
segment length	1	4.35714	2	4.42857
radius	1	.18	1	.18

ELECTRICAL DESCRIPTION
Frequencies (KHz)

	frequency		no. of	segment length (wavelengths)	
no.	lowest	step	steps	minimum	maximum
1	910.	0	1	.0121032	.0123016

Sources

source	node	sector	magnitude	phase	type
1	1	1	858.676	303.1	voltage
2	22	1	891.914	69.3	voltage
3	43	1	214.575	152.6	voltage

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IMPEDANCE
normalization = 50.

freq (KHz)	resist (ohms)	react (ohms)	imped (ohms)	phase (deg)	VSWR	S11 dB	S12 dB
source = 1; node 1, sector 1							
910.	16.875	84.595	86.261	78.7	11.697	-1.4888	-5.3726
source = 2; node 22, sector 1							
910.	23.7	56.219	61.011	67.1	5.0529	-3.4839	-2.5833
source = 3; node 43, sector 1							
910.	20.119	9.618	22.3	25.6	2.594	-7.0617	-.9513

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CURRENT rms
Frequency = 910 KHz
Input power = 4,300. watts
Efficiency = 100. %
coordinates in degrees

current no.	X	Y	Z	mag (amps)	phase (deg)	real (amps)	imaginary (amps)
GND	0	0	0	7.0388	224.4	-5.02715	-4.92672
2	0	0	4.35714	7.27898	224.	-5.23458	-5.05793
3	0	0	8.71429	7.39284	223.8	-5.33912	-5.11351
4	0	0	13.0714	7.43929	223.6	-5.39105	-5.12637
5	0	0	17.4286	7.42655	223.4	-5.39739	-5.10117
6	0	0	21.7857	7.35839	223.2	-5.36127	-5.0401
7	0	0	26.1429	7.23708	223.1	-5.28457	-4.94456
8	**0**	**0**	**30.5**	**7.06444**	**223.**	**-5.16871**	**-4.81568**
9	0	0	34.8571	6.84208	222.9	-5.01494	-4.65451
10	0	0	39.2143	6.57165	222.8	-4.82452	-4.46213
11	0	0	43.5714	6.25481	222.7	-4.59869	-4.23966
12	0	0	47.9286	5.89333	222.6	-4.33879	-3.98826
13	0	0	52.2857	5.48905	222.5	-4.04621	-3.70916
14	0	0	56.6429	5.04383	222.4	-3.72232	-3.40361
15	0	0	61.	4.55955	222.4	-3.36855	-3.07284
16	0	0	65.3571	4.03793	222.3	-2.98618	-2.71801
17	0	0	69.7143	3.48041	222.2	-2.57631	-2.34005
18	0	0	74.0714	2.88779	222.2	-2.13955	-1.9395
19	0	0	78.4286	2.25954	222.1	-1.67551	-1.51598
20	0	0	82.7857	1.59195	222.1	-1.18144	-1.06702
21	0	0	87.1429	.872666	222.	-.648147	-.584338
END	0	0	91.5	0	0	0	0
GND	0	-84.3	0	10.3372	2.2	10.3297	.392849
23	0	-84.3	4.42857	10.5655	1.6	10.5614	.294105
24	0	-84.3	8.85714	10.6516	1.2	10.6492	.22703
25	0	-84.3	13.2857	10.6535	.9	10.6522	.169594
26	0	-84.3	17.7143	10.5793	.6	10.5786	.118892
27	0	-84.3	22.1429	10.4331	.4	10.4328	.0737817
28	0	-84.3	26.5714	10.2175	.2	10.2174	.0337503
29	**0**	**-84.3**	**31.**	**9.93465**	**360.**	**9.93465**	**-1.45E-03**
30	0	-84.3	35.4286	9.58688	359.8	9.58682	-.0319472
31	0	-84.3	39.8571	9.17646	359.6	9.17628	-.0577945
32	0	-84.3	44.2857	8.70563	359.5	8.70527	-.07902
33	0	-84.3	48.7143	8.17713	359.3	8.17657	-.0956363
34	0	-84.3	53.1429	7.59347	359.2	7.59271	-.107649
35	0	-84.3	57.5714	6.9575	359.1	6.95655	-.115065
36	0	-84.3	62.	6.27182	358.9	6.27072	-.117892
37	0	-84.3	66.4286	5.53904	358.8	5.53782	-.116135
38	0	-84.3	70.8571	4.7613	358.7	4.76004	-.109793
39	0	-84.3	75.2857	3.93992	358.6	3.93868	-.0988416
40	0	-84.3	79.7143	3.07441	358.4	3.07329	-.0831969
41	0	-84.3	84.1429	2.16005	358.3	2.15914	-.0626292
42	0	-84.3	88.5714	1.18045	358.2	1.17989	-.0364945
END	0	-84.3	93.	0	0	0	0
GND	0	-168.5	0	6.80398	127.1	-4.10075	5.42936
44	0	-168.5	4.35714	6.81482	126.6	-4.05961	5.47369
45	0	-168.5	8.71429	6.78045	126.2	-4.00734	5.46952

46	0	-168.5	13.0714	6.70749	125.9	-3.93723	5.43034
47	0	-168.5	17.4286	6.5972	125.7	-3.84867	5.35825
48	0	-168.5	21.7857	6.45052	125.5	-3.74165	5.25445
49	0	-168.5	26.1429	6.26836	125.2	-3.61653	5.11987
50	**0**	**-168.5**	**30.5**	**6.05174**	**125.**	**-3.4738**	**4.95543**
51	0	-168.5	34.8571	5.80179	124.8	-3.31411	4.76209
52	0	-168.5	39.2143	5.51977	124.6	-3.1382	4.54088
53	0	-168.5	43.5714	5.20704	124.5	-2.9469	4.2929
54	0	-168.5	47.9286	4.86506	124.3	-2.74111	4.01934
55	0	-168.5	52.2857	4.49538	124.1	-2.52178	3.72143
56	0	-168.5	56.6429	4.09956	124.	-2.28987	3.40042
57	0	-168.5	61.	3.67917	123.8	-2.04635	3.05758
58	0	-168.5	65.3571	3.23567	123.6	-1.79212	2.69405
59	0	-168.5	69.7143	2.77027	123.5	-1.52795	2.31079
60	0	-168.5	74.0714	2.28368	123.3	-1.25434	1.90836
61	0	-168.5	78.4286	1.77561	123.2	-.971219	1.48645
62	0	-168.5	82.7857	1.2433	123.	-.677218	1.04267
63	0	-168.5	87.1429	.677371	122.8	-.367396	.56908
END	0	-168.5	91.5	0	0	0	0

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CURRENT MOMENTS(amp-degrees) rms

Frequency = 910 KHz
Input power = 4,300. watts

			vertical current moment	
wire	magnitude	phase (deg)	magnitude	phase (deg)
1	623.088	223.	623.088	223.
2	890.125	0.0	890.125	0.0
3	534.076	125.	534.076	125.

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	623.088	223.
2	890.125	0.0
3	534.076	125.

These current moment summations show the model produces the correct far-field amplitude and phase relationships.

Item 5

Summary of Post Construction Certified Array Geometry- KKSN

The tower relative distances provided in feet on the Certified Survey drawing of Appendix A were converted to electrical degrees at 910 kilohertz and used along with the survey tower azimuths relative to True North to calculate the distance in electrical degrees from the location specified in the theoretical directional antenna pattern array geometry. This figure provides a tabulation showing those distances and other data that is relevant to their determination.

Tower	Specified Spacing (Deg)	Specified Spacing (Feet)	Specified Azimuth (Deg T)	Surveyed Spacing (Feet)*	Surveyed Azimuth (Deg T)*	Distance from Specified Location (Feet)	Distance from Specified Location (Deg)
1	ref	ref	ref	ref	ref	0	0
2	84.3	253.1	90.0	253.0	90.0	0.1	0.03
3	168.5	505.9	90.0	505.9	90.0	0.0	0.0

*From September 29, 2011 as built survey drawing prepared by D. Gary Hutcheson, RLS

The as built tower displacements from their specified locations expressed in electrical degrees at carrier frequency, which correspond to space phasing differences in the far-field radiation pattern of the array, are well below the guidelines in the FCC Public Notice DA 09-2340 (10/29/2009).

Item 6

Sampling System Measurements - KKSN

Impedance measurements were made of the antenna monitor sampling system using a Hewlett-Packard 8753C 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 loops at the towers.

The following table shows the frequency closest to the carrier frequency where 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 450 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 910 kHz	910 kHz Measured Impedance with Sample Loop Connected
1	1037.05	394.87°	7.8+ j50.2
2	1036.75	394.98°	7.8+ j50.3
3	1035.40	395.50°	7.95+ j51.1

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	933.345	6.9 -J49.9	1140.755	8.78 +J49.8	50.47
2	933.075	6.9 -J49.9	1140.425	8.7 +J49.9	50.51
3	931.860	6.9 -J49.9	1138.940	8.6 +J49.6	50.36

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

Item 7

Reference Field Strength Measurements - KKSN

Reference field strength measurements were made along radials at the azimuths with radiation values specified on the construction permit and, additionally, on the major lobe radial of each pattern.

Measurements were made using a Potomac Instruments field strength meter, model FIM-41, serial number 1302. This meter was last calibrated 12/29/10.

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

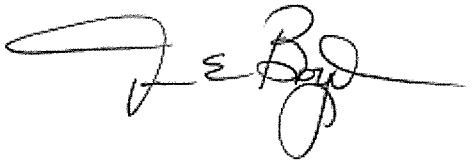
Reference Field Strength Measurements – KKSN, Vancouver, WA 910 kHz DA-D

Radial Azimuth Degrees	Distance km	Field mV/m	GPS Coordinates NAD 83	Point Description
65	7.18	31	45-35-8.16 /122-24-0.27	SW side of NE Franklin Street on sidewalk
65	9.23	24.3	45-35-36.05 / 122-22-34.3	Sidewalk front of 457 W. Lookout Ridge Street
65	9.74	25	45-35-43.08 / 122-22-13.16	Sidewalk front of 2415 N. 4th Street
90	2.34	211	45-33-30.02 / 122-27-13.14	North shoulder of NE Marine Drive
90	3.79	125	45-33-29.98 / 122-26-6.13	Middle of NE 223rd Avenue
90	5.91	68	45-33-30.14 / 122-24-27.72	Middle of road at NW Sundial Road
115	0.93	640	45-33-17.12 / 122-28-22.58	West side of NE 185th Avenue
115	4.19	110	45-32-32.55 / 122-26-6.16	North Side of NE Sandy Boulevard
115	5.61	102	45-32-12 / 122-25-7.28	East parking space at 76 station at NE 238th Drive
190.5	1.19	220	45-32-52.21 / 122-29-11.43	N. side of NE Sandy Blvd, across from Solar Nation
190.5	2.51	90	45-32-10.03 / 122-29-22.55	In street front of 16892 NE Schuyler Street
190.5	3.39	74	45-31-42 / 122-29-29.9	Middle of NE 166th Avenue at NE Oregon Street
349.5	3.2	49	45-35-11.9 / 122-29-28.3	North side of SE Evergreen Hiway
349.5	5.09	21.5	45-36-11.9 / 122-29-44.32	Sidewalk west side of SE 22nd Drive
349.5	6.37	17.8	45-36-52.53 / 122-29-55.	Rose City Printing, SE Redwood Cir.

Reference Field Strength Measurements – KKSN, Vancouver, WA 910 kHz DA-N

Radial Azimuth Degrees	Distance km	Field mV/m	GPS Coordinates NAD 83	Point Description
6	2.97	9*	45-35-5.46 / 122-28-47.86	Entrance to Columbia Vista Corp. just off SE Evergreen Highway
6	3.98	6*	45-35-37-75 / 122-28-41.7	North end of Chevron Station at SE 41st Drive and SE 192nd Avenue
6	5.87	4*	45-36-38.85 / 122-28-32.65	Bus stop just north of SE 15th Street on SE 192nd
		***Field strength varies dramatically with modulation (pattern minimum)**		
90	2.72	90	45-33-29.9 / 122-26-55.9	West side of NE Blue Lake Road
90	3.77	45	45-33-29.9 / 122-26-7.17	Middle of NE 223rd Avenue
90	5.92	11	45-33-31.06 / 122-24-27.92	Middle of NW Sundial Road
174	1.12	78*	45-32-53.9 / 122-28-56.16	North parking lot of Tharco off of NE Sandy Blvd.
174	2.67	15*	45-32-3.78 / 122-28-50.05	Rear of Safeway store just off of NE Halsey Street
174	3.87	9*	45-31-25.44 / 122-28-42.64	Middle of street at 17932 NE Davis Street
		***Field strength varies dramatically with modulation (pattern minimum)**		
270	2.06	540	45-33-29.83 / 122-30-37.43	West side of NE 148th Ave at 5031 mailbox
270	4.15	190	45-33-29.83 / 122-32-14.201	Portland Fire Bureau training center driveway
270	6.82	125	45-33-29.83 / 122-34-16.97	East side of NE 89th Avenue

All measurements were made with a Potomac Instruments FIM-41, serial number 1302 last calibrated on December 29, 2010.
All measurements were made by the undersigned.



James Boyd
Boyd Broadcast Technical Services
21818 SW Columbia Circle
Tualatin, OR 97062
(503) 703-8360

Item 8

Direct Measurement of Power - KKSN

Common point impedance measurements were made using a Hewlet-Packard 8753C network analyzer 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 for both the daytime and nighttime antenna patterns.

Item 9

Antenna Monitor and Sampling System - KKSN

The antenna monitor is a Gorman-Redlich model CMR. The sample loops are connected through equal lengths of ½ inch foam heliax solid outer conductor transmission lines (Andrew LDF-50A phase stabilized cable) to the antenna monitor. The three sample lines are routed to the towers such that they are subject to similar environmental conditions.

Item 10

Construction Permit Condition #3 - KKSN

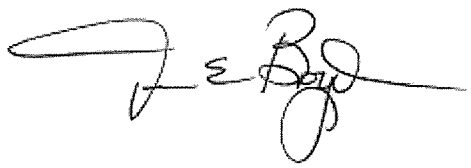
KKSN, 910 kHz, Vancouver, WA, is operating from the same transmitter site as KFXX, 1080 kHz, Portland, OR. KFXX is operating pursuant to construction permit BP-20080717AAW and the provisions of 73.1615 with 12.5 kW daytime and 2.25 kW nighttime, non-directional both day and night. KKSN is operating according to the terms of Construction Permit File Number: BMP-20121213AAR. Measurements were made on October 8th, 2011 to observe any possible spurious emissions which might result from any interaction or intermodulation of the two stations. A Potomac Instruments FIM-41 Field Strength Meter was setup approximately 2.3 kM from the transmitter site. The spectrum from 540 kHz through 5 MHz was scanned for any signs of spurious emissions. In addition third-order intermodulation products were checked. An Agilent N9340B spectrum analyzer was used to check the possibility of 1080-910=170 kHz. The results of the investigation are listed below. At the conclusion of adjustment of the KFXX array, these measurements will be repeated and reported in the license application for KFXX.

170 kHz	No signal observed on Agilent N9340B Spectrum Analyzer
570	KVI Seattle is on this channel…no interference observed
740	KXL on adjacent channel at 750 kHz. Sidebands preclude measurement of 740 kHz. No apparent interference to KXL.
910	KKSN -- 320 mV/m (Reference)
1080	KFXX -- 520 mV/m (Reference)
1250	0.016 mV/m -- 86 dB below KKSN and 90.2 dB below KFXX
1420	KBNP on adjacent channel at 1410 kHz. Sidebands preclude measurement of 1420 kHz. No apparent interference to KBNP.
1990	No signal observed
2560	No signal observed
2900	Less than 0.01 -- More than 90.1 dB below KKSN and more than 94.3 dB below KFXX.

3070	0.016 mV/m -- 86 dB below KKSN and 90.2 dB below KFXX
3410	No signal observed
4720	No signal observed
4890	No signal observed

No other spurious emissions were observed.

The FIM-41 used for these measurements is serial number 1302 and was last calibrated on December 29, 2010. All measurements were made by the undersigned.



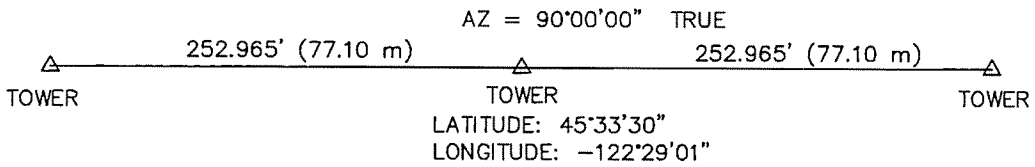
James Boyd
Boyd Broadcast Technical Services

Appendix A

Certified Post Construction Array Geometry

ENTERCOM RADIO TOWERS
NE MARINE DRIVE
MULTNOMAH COUNTY, OREGON

THE DATA SHOWN HERE WAS DERIVED FROM A FIELD SURVEY PERFORMED 29, SEPT. 2011 AND IS BASED ON OREGON NAD 83/91.



LATITUDE: 45°33'30"
LONGITUDE: −122°29'01"

5, OCT. 2011

REGISTERED
PROFESSIONAL
LAND SURVEYOR

OREGON
DECEMBER 2, 1983
D. GARY HUTCHESON
2072

10-06-11

RENEWS: 6/30/13

DAVID EVANS
AND ASSOCIATES INC.
2100 Southwest River Parkway
Portland Oregon 97201
Phone: 503.223.6663

Appendix B

Construction Permit

United States of America

FEDERAL COMMUNICATIONS COMMISSION
AM BROADCAST STATION CONSTRUCTION PERMIT

Official Mailing Address:

ENTERCOM PORTLAND LICENSE, LLC
401 CITY AVENUE, SUITE 809
BALA CYNWYD PA 19004

Authorizing Official:

Son Nguyen
Supervisory Engineer
Audio Division
Media Bureau

Grant Date: April 14, 2011

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

Facility Id: 35033

Call Sign: KKSN

Permit File Number: BMP-20101213AAR

This permit modifies permit no.: BP-20080715ACS

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.	7:45 AM	4:45 PM	Jul.	4:30 AM	8:00 PM
Feb.	7:15 AM	5:30 PM	Aug.	5:15 AM	7:15 PM
Mar.	6:30 AM	6:15 PM	Sep.	5:45 AM	6:30 PM
Apr.	5:30 AM	7:00 PM	Oct.	6:30 AM	5:30 PM
May	4:45 AM	7:30 PM	Nov.	7:15 AM	4:45 PM
Jun.	4:15 AM	8:00 PM	Dec.	7:45 AM	4:30 PM

Name of Permittee: ENTERCOM PORTLAND LICENSE, LLC

Station Location: VANCOUVER, WA

Frequency (kHz): 910

Station Class: B

Antenna Coordinates:

		Day				
Latitude:	N	45	Deg	33	Min	30 Sec
Longitude:	W	122	Deg	28	Min	57 Sec

		Night				
Latitude:	N	45	Deg	33	Min	30 Sec
Longitude:	W	122	Deg	28	Min	57 Sec

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

Nominal Power (kW): Day: 3.3 Night: 4.3

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	1263410	
2	1263413	

Night:

Tower No.	ASRN	Overall Height (m)
1	1263410	
2	1263412	
3	1263413	

DESCRIPTION OF DIRECTIONAL ANTENNA SYSTEM

Theoretical RMS (mV/m/km): Day: 583.89 Night: 686

Standard RMS (mV/m/km): Day: 613.38 Night: 720.72

Augmented RMS (mV/m/km):

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	1.0000	0.000	0.0000	0.000	0	89.9
2	0.3900	210.000	168.5000	90.000	0	89.9

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

Theoretical Parameters:

Night Directional Antenna:

Tower No.	Field Ratio	Phasing (Deg.)	Spacing (Deg.)	Orientation (Deg.)	Tower Ref Switch *	Height (Deg.)
1	0.7000	-137.000	0.0000	0.000	0	89.9
2	1.0000	0.000	84.3000	90.000	0	89.9
3	0.6000	125.000	168.5000	90.000	0	89.9

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

Inverse Distance Field Strength:
The inverse distance field strength at a distance of one kilometer from the above antenna in the directions specified shall not exceed the following values:

Day:

Azimuth:	Radiation:	
90	735.9	mV/m
190.5	326.8	mV/m
349.5	326.8	mV/m

Night:

Azimuth:	Radiation:	
6	38.4	mV/m
90	131.2	mV/m
174	38.4	mV/m

Special operating conditions or restrictions:

1 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 (day) and (night) directional antenna system. The nondirectional and directional field strength measurements must be made under similar environmental conditions. The proof(s) 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).

2 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.

Special operating conditions or restrictions:

3 Before program tests are authorized, sufficient data shall be submitted to show that adequate filters, traps and other equipment has been installed and adjusted to prevent interaction, intermodulation and/or generation of spurious radiation products which may be caused by common usage of the same antenna system by Stations KKSN, Vancouver, WA, 35033 and KFXX, Portland, OR, 57830, and there shall be filed with the license application copies of a firm agreement entered into by the two (2)stations involved clearly fixing the responsibility of each with regard to the installation and maintenance of such equipment. In addition, field observations shall be made to determine whether spurious emissions exist and any objectionable problems resulting therefrom shall be eliminated. Following construction, and prior to authorization of program test under this grant, Stations KKSN, Vancouver, WA, 35033 and KFXX, Portland, OR, 57830 shall each measure antenna or common point resistance and submit FCC Form 302 as application notifying the return to direct measurement of power.

4 Ground system consists of 120 equally spaced, buried, copper radials about the base of each tower, each 275 feet meters in length about towers #1 and #3 and 320 feet in length about tower #2 to compensate for loss of ground system at property boundaries, except where terminated by property boundaries or where intersecting radials are shortened and bonded to a transverse copper strap midway between adjacent towers.

*** END OF AUTHORIZATION ***

Agreement between KKSN(AM) and KFXX(AM) per CP Condition #3

KKSN(AM), Vancouver, WA Facility ID #35033 and KFXX(AM), Portland, OR Facility ID #57830 are both licensed to Entercom Portland License, LLC. The stations have construction permits to co-locate at a new transmitter site utilizing a new common antenna system. In response to special operating condition or restriction #3 on the KKSN(AM) Permit File #BMP-20101213AAR, the Licensee states that it is the sole responsible party for the installation and continued maintenance of adequate filters, traps and other equipment necessary to prevent interaction, intermodulation and/or the generation of spurious radiation products which may be caused by common usage of the same antenna system.