CLEAR CHANNEL RADIO

Technical & Capital Management
2625 South Memorial Drive, Suite A
Tulsa, OK 74129

Steve Davis
SVP, Engineering
and Capital Management
SteveDavis@clearchannel.com

February 16, 2011

BY FEDERAL EXPRESS

Ms. Marlene H. Dortch, Secretary
Federal Communications Commission
445 Twelfth Street, S.W.
Washington, DC 20554

RE: Capstar TX LLC (FRN No. 0019-3629-53)
Application (Form 302-AM) for License to Cover
Construction Permit No. BP-20100917ABA
WXKS (AM), 1200 kHz, Newton, MA; Facility ID No. 20441

Dear Ms. Dortch:

On behalf of Capstar TX LLC, the licensee of the above-referenced station, hereby submits an original and five copies of an application for license to cover construction permit BP-20100917ABA, submitted on FCC Form 302-AM.

Also enclosed is Form 159, Remittance Advice, showing credit card payment of the $1,320.00 filing fee.

Please stamp and return the additional copy of this application and contact the undersigned with any communications regarding this submission.

Respectfully submitted,

CLEAR CHANNEL RADIO

By: _____
Allan Brace
Technical Director

cc: WXKS (AM) Public Inspection File

Troy Langham
FCC Engineering Supervisor
TroyLangham@clearchannel.com

FCCContact@clearchannel.com

Phone: (918) 664-4581

Stacy McMillen
FCC Filing Supervisor
StacyMcMillen@clearchannel.com

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 N BMML-20110217ADC

SECTION I - APPLICANT FEE INFORMATION

BMML-20110217

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

CAPSTAR TX LLC

MAILING ADDRESS (Line 1) (Maximum 35 characters)
2625 S. Memorial

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

CITY	STATE OR COUNTRY (if foreign address)	ZIP CODE
Tulsa	OK	74129

TELEPHONE NUMBER (include area code)	CALL LETTERS	OTHER FCC IDENTIFIER (If applicable)
918-664-4581	WXKS	Facility ID: 20441

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: 0019362953

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	$ 615.00	

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	$ 705.00	

	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.	$ 1320.00	

SECTION II - APPLICANT INFORMATION		
1. NAME OF APPLICANT Capstar TX LLX		
MAILING ADDRESS 2625 S. Memorial, Ste A		
CITY Tulsa	STATE OK	ZIP CODE 74129

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
WXKS	Newton, MA	BP-20100917ABA		1/4/2014

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

☑ Yes ☐ No

If No, explain in an Exhibit.

Exhibit No.

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

☑ Yes ☐ No

If No, state exceptions in an Exhibit.

Exhibit No.

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

☐ Yes ☑ No

If Yes, explain in an Exhibit.

Exhibit No.

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

☐ Yes ☐ No

☐ Does not apply

If No, explain in an Exhibit.

Exhibit No.

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

☐ Yes ☑ No

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

Exhibit No.

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

☐ Yes ☑ No

If Yes, provide particulars as an Exhibit.

Exhibit No.

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

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

CERTIFICATION

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

☑ Yes ☐ No

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

Name	Signature	
Stephen G. Davis		
Title	Date	Telephone Number
Senior Vice President, Engineering	2/16/2011	918-664-4581

WILLFUL FALSE STATEMENTS ON THIS FORM ARE PUNISHABLE BY FINE AND/OR IMPRISONMENT (U.S. CODE, TITLE 18, SECTION 1001), AND/OR REVOCATION OF ANY STATION LICENSE OR CONSTRUCTION

FCC NOTICE TO INDIVIDUALS REQUIRED BY THE PRIVACY ACT AND THE PAPERWORK REDUCTION ACT

The solicitation of personal information requested in this application is authorized by the Communications Act of 1934, as amended. The Commission will use the information provided in this form to determine whether grant of the application is in the public interest. In reaching that determination, or for law enforcement purposes, it may become necessary to refer personal information contained in this form to another government agency. In addition, all information provided in this form will be available for public inspection. If information requested on the form is not provided, the application may be returned without action having been taken upon it or its processing may be delayed while a request is made to provide the missing information. Your response is required to obtain the requested authorization.

Public reporting burden for this collection of information is estimated to average 639 hours and 53 minutes per response, including the time for reviewing instructions, searching existing data sources, gathering and maintaining the data needed, and completing and reviewing the collection of information. Comments regarding this burden estimate or any other aspect of this collection of information, including suggestions for reducing the burden, can be sent to the Federal Communications Commission, Records Management Branch, Paperwork Reduction Project (3060-0627), Washington, D. C. 20554. Do NOT send completed forms to this address.

THE FOREGOING NOTICE IS REQUIRED BY THE PRIVACY ACT OF 1974, P.L. 93-579, DECEMBER 31, 1974, 5 U.S.C. 552a(e)(3), AND THE PAPERWORK REDUCTION ACT OF 1980, P.L. 96-511, DECEMBER 11, 1980, 44 U.S.C. 3507.

SECTION III - LICENSE APPLICATION ENGINEERING DATA

Name of Applicant

CAPSTAR TX LLC (NEW DAY DA, NIGHT UNCHANGED)

PURPOSE OF AUTHORIZATION APPLIED FOR: (check one)

☑ Station License ☐ Direct Measurement of Power

1. Facilities authorized in construction permit					
Call Sign	File No. of Construction Permit (if applicable)	Frequency (kHz)	Hours of Operation	Power in kilowatts	
				Night	Day
WKOX	BP-20100917ABA	1200	UNLIMITED	50	50

2. Station location	
State	City or Town
MASSACHUSETTS	NEWTON

3. Transmitter location			
State	County	City or Town	Street address (or other identification)
MA	MIDDLESEX	NEWTON	750 SAWMILL BROOK PKWY

4. Main studio location			
State	County	City or Town	Street address (or other identification)
MA	MIDDLESEX	MEDFORD	10 CABOT RD. SUITE 302

5. Remote control point location (specify only if authorized directional antenna)			
State	County	City or Town	Street address (or other identification)
MA	MIDDLESEX	MEDFORD	10 CABOT RD. SUITE 302

6. Has type-approved stereo generating equipment been installed? ☐ Yes ☑ No

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

Attach as an Exhibit a detailed description of the sampling system as installed. Exhibit No. ON FILE

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
32.4	32.4
Measured antenna or common point resistance (in ohms) at operating frequency	**Measured antenna or common point reactance (in ohms) at operating frequency**
Night 50.0 Day 50.0	Night - Day -

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	+122.4	+70.1	0.514	0.502	-	-
2	0.0	0.0	1.000	1.000	-	-
3	-129.6	+150.6	0.539	0.156	-	-
4		+140.2		0.252		

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

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, STEEL GUYED	59.4	60.3	60.3	Exhibit No. N/A

Excitation ☑ Series ☐ Shunt

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

North Latitude	West Longitude
42 ° 17 ' 20 "	71 ° 11 ' 21 "

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. N/A

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

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

NONE

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

N/A

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
RONALD D. RACKLEY	Ronald D Rackley
Address (include ZIP Code)	Date
DLR, INC. 201 FLETCHER AVENUE SARASOTA, FL 34237	2/10/2011
	Telephone No. (Include Area Code) 941-329-6000

☐ Technical Director ☑ Registered Professional Engineer

☐ Chief Operator ☐ Technical Consultant

☐ Other (specify)

APPLICATION FOR LICENSE INFORMATION
RADIO STATION WXKS
NEWTON, MASSACHUSETTS

1200 KHZ 50 KW U DA-2

February 10, 2011

APPLICATION FOR LICENSE INFORMATION
RADIO STATION WXKS
NEWTON, MASSACHUSETTS

1200 KHZ 50 KW U DA-2

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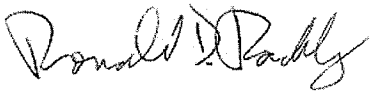
Executive Summary - WXKS

This engineering exhibit supports an application for license for the newly adjusted daytime directional antenna system of radio station WXKS in Newton, Massachusetts. WXKS operates on 1200 kilohertz. The new WXKS daytime directional antenna pattern, which replaces one of the same power level that has been licensed at the site since 2009, was authorized by FCC construction permit number BP-20100917ABA.

The site is shared with two other stations, WRCA on 1330 kilohertz and WUNR on 1600 kilohertz. The new WXKS daytime directional antenna pattern uses four of the five towers that are employed by the other stations at the site and the remaining tower is detuned at 1200 kilohertz.

The towers, ground system, antenna monitor and antenna monitor sampling system remain unchanged. The filters that allow simultaneous operation by the three stations remain unchanged also. The WXKS nighttime directional antenna pattern remains unchanged.

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



Ronald D. Rackley, P.E.
du Treil, Lundin & Rackley, Inc.
February 10, 2011

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

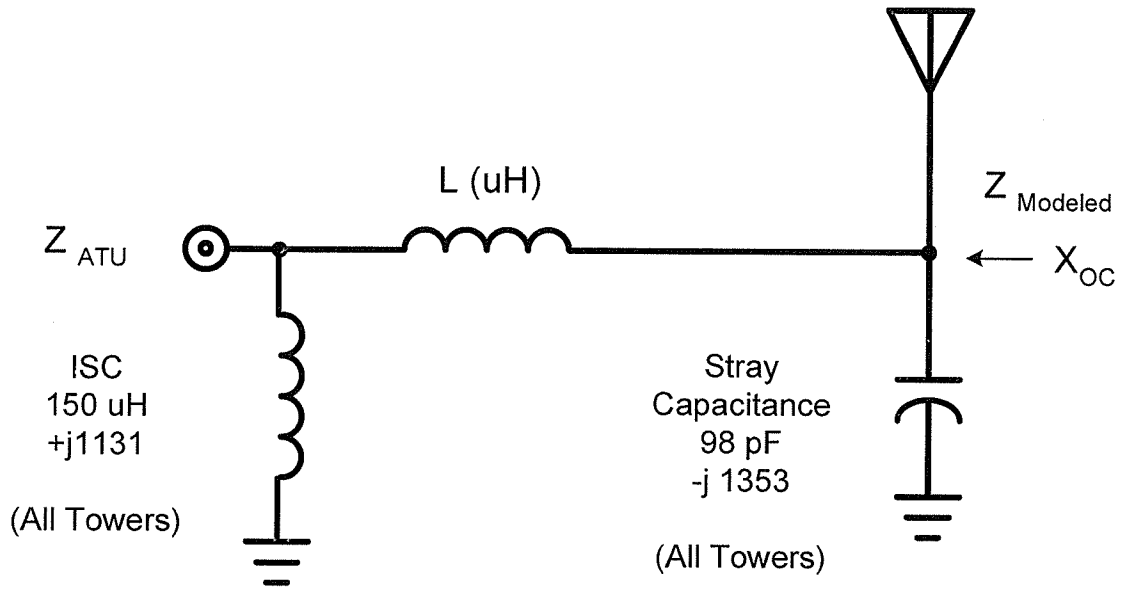
Tower base impedance measurements were made at the final J-plugs within the Antenna Tuning Units ("ATUs") using a Hewlett-Packard 8751A network analyzer and a Tunwall Radio directional coupler in a calibrated measurement system. The other towers were all open circuited at the same points where impedance measurements were made for them (the "reference points") for each of the measurements.

The reference point in each ATU is followed by the shunt connection of the 150 microhenry sampling line isolation coil, which is located within the output section of the cabinet that also houses filters and matching networks and is followed by the feedline that exits the ATU enclosure and is connected to the tower above the base insulator. Circuit calculations were performed to relate the method of moments modeled impedances of the tower feedpoints to the ATU output measurement (reference) points as shown on the following pages. The Xoc shown for each tower, which was calculated for the parallel combination of the two coils in series and the assumed stray capacitance, was used in the method of moments model as a load at ground level for the open circuited case.

In addition to the page showing the schematic of the assumed circuit and tabulation of calculated values, pages showing the results of calculations using the WCAP network analysis program from Westberg Consulting are provided. WCAP performs such calculations using nodal analysis, as do other modern circuit analysis programs such as the commonly available ones based on SPICE software.

In each of the WCAP tabulations, node 2 represents the ATU output reference point and node 3 represents the tower feedpoint. Node 0 represents ground potential. It should be noted that the calculated ATU output impedances appear under the "TO NODE IMPEDANCE" columns of the WCAP tabulations, following the phantom 1.0 ohm resistors (R 1 - 2) that were included in series with the drive current sources (I 0 -1)) to provide calculation points for the impedances. The tower feedpoint impedances from the method of moments model are represented by complex loads from node 3 to ground (R 3 - 0). The assumed stray capacitance of 98 picofarads was used for the calculations of all of the towers, although it appears as 0.0001 (microfarad) on the WCAP printout due to rounding. The numerals in the file names shown on the tabulations correspond to the tower numbers.

The modeled and measured base impedances at the ATU output jacks with the other towers open circuited at their ATU output jacks agree within +/- 2 ohms and +/- 4 percent for resistance and reactance, as required by the FCC Rules.



TOWER	L (uH)	X_L	X_{OC}	$Z_{modeled}$	Z ATU (Modeled)	Z_{ATU} (Measured)
1	1.950	+ j 14.7	+ j 7,478	43.3+j 27.7	41.9 +j 41.7	41.4 +j 41.5
2	2.003	+ j 15.1	+ j 7,495	43.0 +j 29.1	41.6 +j 43.4	39.2 +j 43.3
3	4.085	+ j 30.8	+ j 8,221	38.9 +j 11.7	36.8 +j 41.2	36.0 +j 41.2
4	2.241	+ j 16.9	+ j 7,572	42.9 +j 26.2	41.4 +j 42.2	41.2 +j 42.2
5	2.958	+ j 22.3	+ j 7,814	42.5 +j24.2	40.6 +j45.3	41.0 +j45.1

ANALYSIS OF TOWER IMPEDANCE MEASUREMENTS TO VERIFY METHOD OF MOMENTS MODEL

RADIO STATION WXKS
NEWTON, MASSACHUSETTS
1200 KHZ 50 KW U DA-2

du Treil, Lundin & Rackley, Inc. Sarasota, Florida

WESTBERG CIRCUIT ANALYSIS PROGRAM

FILE NAME = WXKS1OC.cir

I	1.0000	0	1	.0000	.0000	.0000
R	1.0000	1	2	.0000	.0000	.0000
L	150.0000	2	0	.0000	.0000	.0000
L	1.9500	2	3	.0000	.0000	.0000
C	.0001	3	0	.0000	.0000	.0000
R	43.3000	3	0	27.7000	.0000	.0000
EX	.0000	0	0	.0000	.0000	.0000

FREQ = 1.200

NODE	VOLT MAG	VOLT PHASE
1	59.7801	44.1642
2	59.0668	44.8400
3	50.5541	32.9390

				BRANCH VOLTAGE		BRANCH CURRENT		FROM NODE IMPEDANCE		TO NODE IMPEDANCE	
				MAG	PHASE	MAG	PHASE	RESISTANCE	REACTANCE	RESISTANCE	REACTANCE
R	1-	2	1.000	1.00	.000	1.00	.000	42.88	41.65	41.88	41.65
L	2-	0	150.000	59.07	44.840	.05	-45.160	.00	1130.97	.00	.00
L	2-	3	1.950	14.17	92.202	.96	2.202	45.08	41.51	45.08	26.81
C	3-	0	.000	50.55	32.939	.04	122.939	.00	-1353.36	.00	.00
R	3-	0	43.300	50.55	32.939	.98	.331	43.30	27.70	.00	.00

REACTANCE VSWR

WESTBERG CIRCUIT ANALYSIS PROGRAM

FILE NAME = WXKS2oc.cir

I	1.0000	0	1	.0000	.0000	.0000
R	1.0000	1	2	.0000	.0000	.0000
L	150.0000	2	0	.0000	.0000	.0000
L	2.0030	2	3	.0000	.0000	.0000
C	.0001	3	0	.0000	.0000	.0000
R	43.0000	3	0	29.1000	.0000	.0000
EX	.0000	0	0	.0000	.0000	.0000

FREQ = 1.200

NODE	VOLT MAG	VOLT PHASE
1	60.7563	45.5471
2	60.0602	46.2281
3	51.0377	34.4159

				BRANCH VOLTAGE		BRANCH CURRENT	FROM NODE IMPEDANCE		TO NODE IMPEDANCE	
				MAG	PHASE	MAG	PHASE	RESISTANCE	REACTANCE	RESISTANCE	REACTANCE
R	1-	2	1.000	1.00	.000	1.00	.000	42.55	43.37	41.55	43.37
L	2-	0	150.000	60.06	46.228	.05	-43.772	.00	1130.97	.00	.00
L	2-	3	2.003	14.53	92.188	.96	2.188	44.86	43.38	44.86	28.28
C	3-	0	.000	51.04	34.416	.04	124.416	.00	-1353.36	.00	.00
R	3-	0	43.000	51.04	34.416	.98	.328	43.00	29.10	.00	.00

WESTBERG CIRCUIT ANALYSIS PROGRAM

FILE NAME = WXKS3oc.cir

I	1.0000	0	1	.0000	.0000	.0000
R	1.0000	1	2	.0000	.0000	.0000
L	150.0000	2	0	.0000	.0000	.0000
L	4.0850	2	3	.0000	.0000	.0000
C	.0001	3	0	.0000	.0000	.0000
R	38.9000	3	0	11.7000	.0000	.0000
EX	.0000	0	0	.0000	.0000	.0000

FREQ = 1.200

NODE	VOLT MAG	VOLT PHASE
1	55.9074	47.5159
2	55.2369	48.2808
3	39.4878	17.0110

				BRANCH VOLTAGE		BRANCH CURRENT		FROM NODE IMPEDANCE		TO NODE IMPEDANCE	
				MAG	PHASE	MAG	PHASE	RESISTANCE	REACTANCE	RESISTANCE	REACTANCE
			VSWR								
R	1-	2	1.000	1.00	.000	1.00	.000	37.76	41.23	36.76	41.23
L	2-	0	150.000	55.24	48.281	.05	-41.719	.00	1130.97	.00	.00
L	2-	3	4.085	29.69	91.932	.96	1.932	39.55	41.46	39.55	10.66
C	3-	0	.000	39.49	17.011	.03	107.011	.00	-1353.36	.00	.00
R	3-	0	38.900	39.49	17.011	.97	.271	38.90	11.70	.00	.00

WESTBERG CIRCUIT ANALYSIS PROGRAM

FILE NAME = WXKS4oc.cir

I	1.0000	0	1	.0000	.0000	.0000
R	1.0000	1	2	.0000	.0000	.0000
L	150.0000	2	0	.0000	.0000	.0000
L	2.2410	2	3	.0000	.0000	.0000
C	.0001	3	0	.0000	.0000	.0000
R	42.9000	3	0	26.2000	.0000	.0000
EX	.0000	0	0	.0000	.0000	.0000

FREQ = 1.200

NODE	VOLT MAG	VOLT PHASE
1	59.8116	44.9123
2	59.1076	45.5967
3	49.3560	31.7374

				BRANCH VOLTAGE		BRANCH CURRENT		FROM NODE IMPEDANCE		TO NODE IMPEDANCE	
				MAG	PHASE	MAG	PHASE	RESISTANCE	REACTANCE	RESISTANCE	REACTANCE
R	1-	2	1.000	1.00	.000	1.00	.000	42.36	42.23	41.36	42.23
L	2-	0	150.000	59.11	45.597	.05	-44.403	.00	1130.97	.00	.00
L	2-	3	2.241	16.28	92.175	.96	2.175	44.56	42.17	44.56	25.28
C	3-	0	.000	49.36	31.737	.04	121.737	.00	-1353.36	.00	.00
R	3-	0	42.900	49.36	31.737	.98	.324	42.90	26.20	.00	.00

WESTBERG CIRCUIT ANALYSIS PROGRAM

FILE NAME = WXKS5oc.cir

I	1.0000	0	1	.0000	.0000	.0000
R	1.0000	1	2	.0000	.0000	.0000
L	150.0000	2	0	.0000	.0000	.0000
L	2.9580	2	3	.0000	.0000	.0000
C	.0001	3	0	.0000	.0000	.0000
R	42.5000	3	0	24.2000	.0000	.0000
EX	.0000	0	0	.0000	.0000	.0000

FREQ = 1.200

NODE	VOLT MAG	VOLT PHASE
1	61.5107	47.4211
2	60.8386	48.1145
3	47.8121	29.9689

				BRANCH VOLTAGE		BRANCH CURRENT		FROM NODE IMPEDANCE		TO NODE IMPEDANCE	
				MAG	PHASE	MAG	PHASE	RESISTANCE	REACTANCE	RESISTANCE	REACTANCE
			VSWR								
R	1-	2	1.000	1.00	.000	1.00	.000	41.62	45.29	40.62	45.29
L	2-	0	150.000	60.84	48.115	.05	-41.885	.00	1130.97	.00	.00
L	2-	3	2.958	21.42	92.143	.96	2.143	44.02	45.54	44.02	23.23
C	3-	0	.000	47.81	29.969	.04	119.969	.00	-1353.36	.00	.00
R	3-	0	42.500	47.81	29.969	.98	.311	42.50	24.20	.00	.00

Derivation of Operating Parameters for Daytime Directional Antenna - WXKS

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 pattern. With these voltage sources, the tower currents were calculated. Twelve segments were used for each tower, so that the modeled current pulse between the fourth and fifth segments above ground level would correspond to the sampling loop location on each tower – at 1/3 of the total tower height above the base insulator. This is the height at which a null in tower current corresponds to the detuned condition. As the tower structures, sampling loops and sampling lines are identical, the antenna monitor ratios and phases corresponding to the theoretical parameters were calculated directly from the modeled tower currents.

Tower	Modeled Current Pulse	Current Magnitude (amperes)	Current Phase (degrees)	Antenna Monitor Ratio	Antenna Monitor Phase (degrees)
1	5	13.311	+70.0	0.502	+70.1
2	17	26.540	+359.9	1.000	0.0
3	29	4.138	+150.5	0.156	+150.6
4	41	6.691	+140.1	0.252	+140.2
5	53	0.017	--	Minimized	--

Method of Moments Model Details for Towers Driven Individually - WXKS

The array of towers was modeled using expert MININEC Broadcast Professional Version 14.5. One wire was used to represent each tower. The top and bottom wire end points were specified using meters in the Cartesian coordinate system, as converted from the theoretical directional antenna specifications taking into account the carrier frequency wavelength. The modeling option to place a "cap" on the upper end of each wire was chosen, which automatically adds the wire radius to each tower height for current calculations internal to the program. Each tower was modeled using 12 wire segments. As the towers are physically 85.6 degrees in electrical height, the segment length is 7.13 electrical degrees.

The individual tower characteristics were adjusted to provide a match of their modeled impedances, when presented to a circuit model which included branches representing the stray capacitances, feedline hookup inductances and sampling line isolation coils at the tower bases, with the base impedances that were measured at the output jacks of the Antenna Tuning Units while the other towers of the array were open circuited. The method of moments model assumed loads at ground level having the reactances that were calculated for them using the base circuit models for the open circuited towers of the array.

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 perecnt 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 24 inches.

Tower	Physical Height (meters)	Modeled Height (meters)	Modeled Percent of Height	Modeled Radius (meters)	Percent of Equivalent Radius
1	59.4	63.1	106.2	0.29	100
2	59.4	63.5	106.9	0.29	100
3	59.4	61.0	102.7	0.29	100
4	59.4	62.9	105.9	0.29	100
5	59.4	62.6	105.4	0.29	100

The following pages show the details of the method of moments models for the individually driven towers. The numerals in the file names shown on the tabulations correspond to the tower numbers.

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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							
1.2	43.264	27.686	51.364	32.6	1.8284	-10.666	-.3895

GEOMETRY
Dimensions in meters
Environment: perfect ground

wire	caps	X	Y	Z	radius	segs
1	2	0	0	0	.29	12
		0	0	63.1		
2	2	18.7	51.4	0	.29	12
		18.7	51.4	63.5		
3	2	30.6	100.2	0	.29	12
		30.6	100.2	61.		
4	2	-88.6	38.9	0	.29	12
		-88.6	38.9	62.9		
5	2	-76.7	97.9	0	.29	12
		-76.7	97.9	62.6		

Number of wires = 5
current nodes = 60

	minimum		maximum	
Individual wires	wire	value	wire	value
segment length	3	5.1075	2	5.31583
segment/radius ratio	3	17.6121	2	18.3305
radius	1	.29	1	.29

ELECTRICAL DESCRIPTION
Frequencies (MHz)

	frequency		no. of	segment length (wavelengths)	
no.	lowest	step	steps	minimum	maximum
1	1.2	0	1	.0204436	.0212775

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	1	0	0	0	0	0
2	13	0	7,495.	0	0	0
3	25	0	8,221.	0	0	0
4	37	0	7,572.	0	0	0
5	49	0	7,814.	0	0	0

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IMPEDANCE
normalization = 50.

freq (MHz)	resist (ohms)	react (ohms)	imped (ohms)	phase (deg)	VSWR	S11 dB	S12 dB
source = 1; node 13, sector 1							
1.2	43.02	29.106	51.942	34.1	1.8864	-10.255	-.43018

GEOMETRY
Dimensions in meters
Environment: perfect ground

wire	caps	X	Y	Z	radius	segs
1	2	0	0	0	.29	12
		0	0	63.1		
2	2	18.7	51.4	0	.29	12
		18.7	51.4	63.5		
3	2	30.6	100.2	0	.29	12
		30.6	100.2	61.		
4	2	-88.6	38.9	0	.29	12
		-88.6	38.9	62.9		
5	2	-76.7	97.9	0	.29	12
		-76.7	97.9	62.6		

Number of wires = 5
current nodes = 60

	minimum		maximum	
Individual wires	wire	value	wire	value
segment length	3	5.1075	2	5.31583
segment/radius ratio	3	17.6121	2	18.3305
radius	1	.29	1	.29

ELECTRICAL DESCRIPTION
Frequencies (MHz)

	frequency		no. of	segment length (wavelengths)	
no.	lowest	step	steps	minimum	maximum
1	1.2	0	1	.0204436	.0212775

Sources

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

Lumped loads

load	node	resistance (ohms)	reactance (ohms)	inductance (mH)	capacitance (uF)	passive circuit
1	1	0	7,478.	0	0	0
2	13	0	0	0	0	0
3	25	0	8,221.	0	0	0
4	37	0	7,572.	0	0	0
5	49	0	7,814.	0	0	0

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IMPEDANCE
normalization = 50.

freq (MHz)	resist (ohms)	react (ohms)	imped (ohms)	phase (deg)	VSWR	S11 dB	S12 dB
source = 1; node 25, sector 1							
1.2	38.932	11.671	40.644	16.7	1.437	-14.927	-.14195

GEOMETRY
Dimensions in meters
Environment: perfect ground

wire	caps	X	Y	Z	radius	segs
1	2	0	0	0	.29	12
		0	0	63.1		
2	2	18.7	51.4	0	.29	12
		18.7	51.4	63.5		
3	2	30.6	100.2	0	.29	12
		30.6	100.2	61.		
4	2	-88.6	38.9	0	.29	12
		-88.6	38.9	62.9		
5	2	-76.7	97.9	0	.29	12
		-76.7	97.9	62.6		

Number of wires = 5
current nodes = 60

	minimum		maximum	
Individual wires	wire	value	wire	value
segment length	3	5.1075	2	5.31583
segment/radius ratio	3	17.6121	2	18.3305
radius	1	.29	1	.29

ELECTRICAL DESCRIPTION
Frequencies (MHz)

	frequency		no. of	segment length (wavelengths)	
no.	lowest	step	steps	minimum	maximum
1	1.2	0	1	.0204436	.0212775

Sources

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

Lumped loads

load	node	resistance (ohms)	reactance (ohms)	inductance (mH)	capacitance (uF)	passive circuit
1	1	0	7,478.	0	0	0
2	13	0	7,495.	0	0	0
3	25	0	0	0	0	0
4	37	0	7,572.	0	0	0
5	49	0	7,814.	0	0	0

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IMPEDANCE
normalization = 50.

freq (MHz)	resist (ohms)	react (ohms)	imped (ohms)	phase (deg)	VSWR	S11 dB	S12 dB
source = 1; node 37, sector 1							
1.2	42.906	26.249	50.299	31.5	1.7842	-11.006	-.35894

GEOMETRY
Dimensions in meters
Environment: perfect ground

wire	caps	X	Y	Z	radius	segs
1	2	0	0	0	.29	12
		0	0	63.1		
2	2	18.7	51.4	0	.29	12
		18.7	51.4	63.5		
3	2	30.6	100.2	0	.29	12
		30.6	100.2	61.		
4	2	-88.6	38.9	0	.29	12
		-88.6	38.9	62.9		
5	2	-76.7	97.9	0	.29	12
		-76.7	97.9	62.6		

Number of wires = 5
current nodes = 60

	minimum		maximum	
Individual wires	wire	value	wire	value
segment length	3	5.1075	2	5.31583
segment/radius ratio	3	17.6121	2	18.3305
radius	1	.29	1	.29

ELECTRICAL DESCRIPTION
Frequencies (MHz)

no.	frequency lowest	step	no. of steps	segment length (wavelengths) minimum	maximum
1	1.2	0	1	.0204436	.0212775

Sources

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

Lumped loads

load	node	resistance (ohms)	reactance (ohms)	inductance (mH)	capacitance (uF)	passive circuit
1	1	0	7,478.	0	0	0
2	13	0	7,495.	0	0	0
3	25	0	8,221.	0	0	0
4	37	0	0	0	0	0
5	49	0	7,814.	0	0	0

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IMPEDANCE
normalization = 50.

freq (MHz)	resist (ohms)	react (ohms)	imped (ohms)	phase (deg)	VSWR	S11 dB	S12 dB
source = 1; node 49, sector 1							
1.2	42.529	24.15	48.907	29.6	1.7187	-11.557	-.3146

GEOMETRY
Dimensions in meters
Environment: perfect ground

wire	caps	X	Y	Z	radius	segs
1	2	0	0	0	.29	12
		0	0	63.1		
2	2	18.7	51.4	0	.29	12
		18.7	51.4	63.5		
3	2	30.6	100.2	0	.29	12
		30.6	100.2	61.		
4	2	-88.6	38.9	0	.29	12
		-88.6	38.9	62.9		
5	2	-76.7	97.9	0	.29	12
		-76.7	97.9	62.6		

Number of wires = 5
current nodes = 60

	minimum		maximum	
Individual wires	wire	value	wire	value
segment length	3	5.1075	2	5.31583
segment/radius ratio	3	17.6121	2	18.3305
radius	1	.29	1	.29

ELECTRICAL DESCRIPTION
Frequencies (MHz)

	frequency		no. of	segment length (wavelengths)	
no.	lowest	step	steps	minimum	maximum
1	1.2	0	1	.0204436	.0212775

Sources

source	node	sector	magnitude	phase	type
1	49	1	1.	0	voltage

Lumped loads

load	node	resistance (ohms)	reactance (ohms)	inductance (mH)	capacitance (uF)	passive circuit
1	1	0	7,478.	0	0	0
2	13	0	7,495.	0	0	0
3	25	0	8,221.	0	0	0
4	37	0	7,572.	0	0	0
5	49	0	0	0	0	0

Method of Moments Model Details for Daytime Directional Antenna - WXKS

The array of towers was modeled using expert MININEC Broadcast Professional Version 14.5 with 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 methodology results in a voltage source at the base of tower 5 of the array, which is not used in the daytime directional antenna pattern. This source does not represent any connection to the active circuitry of the phasing and coupling equipment. Rather, it represents the voltage that is developed across the detuning impedance at the base of the tower when the tower is detuned. Minimized tower current at the height of the sampling loop on tower 5, which is represented by node 53 of the model, confirms the detuned condition.

Tower	Wire	Base Node
1	1	1
2	2	13
3	3	25
4	4	37
5	5	49

The top end Z coordinates for the wires in the current tabulation are 0.29 meter greater than the tower heights specified in the model because the end cap option was selected for the top of each tower and the software automatically added the specified wire radius for the calculations. The same was the case for the individual tower models.

It should be noted that voltages and currents shown on the tabulations not specified as "rms" values are the corresponding peak values.

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

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GEOMETRY
Dimensions in meters
Environment: perfect ground

wire	caps	X	Y	Z	radius	segs
1	2	0	0	0	.29	12
		0	0	63.1		
2	2	18.7	51.4	0	.29	12
		18.7	51.4	63.5		
3	2	30.6	100.2	0	.29	12
		30.6	100.2	61.		
4	2	-88.6	38.9	0	.29	12
		-88.6	38.9	62.9		
5	2	-76.7	97.9	0	.29	12
		-76.7	97.9	62.6		

Number of wires = 5
current nodes = 60

	minimum		maximum	
Individual wires	wire	value	wire	value
segment length	3	5.1075	2	5.31583
segment/radius ratio	3	17.6121	2	18.3305
radius	1	.29	1	.29

ELECTRICAL DESCRIPTION
Frequencies (MHz)

	frequency		no. of	segment length (wavelengths)	
no.	lowest	step	steps	minimum	maximum
1	1.2	0	1	.0204436	.0212775

Sources

source	node	sector	magnitude	phase	type
1	1	1	1,264.47	39.7	voltage
2	13	1	2,999.04	44.	voltage
3	25	1	1,529.75	342.9	voltage
4	37	1	787.529	271.4	voltage
5	49	1	754.54	291.5	voltage

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MEDIUM WAVE ARRAY SYNTHESIS FROM FIELD RATIOS

Frequency = 1.2 MHz

tower	field ratio magnitude	phase (deg)
1	.5	70.
2	1.	0
3	.15	150.
4	.25	140.
5	0	0

VOLTAGES AND CURRENTS - rms

source node	voltage magnitude	phase (deg)	current magnitude	phase (deg)
1	894.114	39.7	16.1974	75.8
13	2,120.65	44.	27.3859	6.5
25	1,081.7	342.9	5.61914	128.3
37	556.867	271.4	6.79897	133.8
49	533.541	291.5	1.08982	20.2

Sum of square of source currents = 2,182.66
Total power = 50,000. watts

TOWER ADMITTANCE MATRIX

admittance	real (mhos)	imaginary (mhos)
Y(1, 1)	.00930878	-.00947283
Y(1, 2)	.00189658	.00953821
Y(1, 3)	.00010167	.000342237
Y(1, 4)	.00267687	.00422904
Y(1, 5)	-.000671886	.00172297
Y(2, 1)	.00189679	.00953828
Y(2, 2)	.00201694	-.0143348
Y(2, 3)	.000487276	.01301
Y(2, 4)	-.000360567	.00229872
Y(2, 5)	-.000590717	.0027345
Y(3, 1)	.000101653	.000342009
Y(3, 2)	.000486579	.0130102
Y(3, 3)	.0147551	-.0114297
Y(3, 4)	-.000976694	.00129947
Y(3, 5)	.00275087	.00442135
Y(4, 1)	.00267688	.00422907
Y(4, 2)	-.000360647	.00229865
Y(4, 3)	-.000976635	.00129961
Y(4, 4)	.00917698	-.00873864
Y(4, 5)	.00167656	.00971169
Y(5, 1)	-.000671837	.00172298
Y(5, 2)	-.000590877	.00273438
Y(5, 3)	.00275101	.00442139
Y(5, 4)	.00167652	.0097117
Y(5, 5)	.00997211	-.00852582

TOWER IMPEDANCE MATRIX

impedance	real (ohms)	imaginary (ohms)
Z(1, 1)	43.2027	27.7492
Z(1, 2)	26.0304	-16.28
Z(1, 3)	-2.5962	-20.8138
Z(1, 4)	.835922	-20.9182
Z(1, 5)	-11.9785	-14.3428
Z(2, 1)	26.0306	-16.2798
Z(2, 2)	42.8733	29.0683
Z(2, 3)	27.3533	-13.6201
Z(2, 4)	-6.2962	-19.0818
Z(2, 5)	-5.27181	-19.1657
Z(3, 1)	-2.59678	-20.8138
Z(3, 2)	27.3519	-13.6219
Z(3, 3)	38.9018	11.6814
Z(3, 4)	-13.8121	-10.227
Z(3, 5)	-3.82866	-17.8339
Z(4, 1)	.835855	-20.9182
Z(4, 2)	-6.29632	-19.0818
Z(4, 3)	-13.812	-10.2272
Z(4, 4)	42.859	26.3118
Z(4, 5)	23.7849	-17.8407
Z(5, 1)	-11.9786	-14.3427
Z(5, 2)	-5.27202	-19.1657
Z(5, 3)	-3.82829	-17.834
Z(5, 4)	23.7847	-17.8408
Z(5, 5)	42.5057	24.2074

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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							
1.2	44.618	-32.502	55.201	323.9	1.982	-9.6481	-.4985
source = 2; node 13, sector 1							
1.2	61.442	47.128	77.436	37.5	2.3379	-7.9411	-.76058
source = 3; node 25, sector 1							
1.2	-158.48	-109.27	192.5	214.6	****	****	****
source = 4; node 37, sector 1							
1.2	-60.496	55.214	81.905	137.6	****	****	****
source = 5; node 49, sector 1							
1.2	11.447	-489.43	489.56	271.3	423.12	-4.1E-02	-20.265

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CURRENT rms
Frequency = 1.2 MHz
Input power = 50,000. watts
Efficiency = 100. %
coordinates in meters
current

no.	X	Y	Z	mag (amps)	phase (deg)	real (amps)	imaginary (amps)
GND	0	0	0	16.1975	75.8	3.9777	15.7015
2	0	0	5.2825	15.6605	73.7	4.40495	15.0282
3	0	0	10.565	15.0522	72.3	4.58521	14.3369
4	0	0	15.8475	14.271	71.1	4.63033	13.499
5	0	0	21.13	13.3113	70.	4.55418	12.508
6	0	0	26.4125	12.1782	69.	4.36358	11.3696
7	0	0	31.695	10.882	68.1	4.0634	10.0949
8	0	0	36.9775	9.43546	67.2	3.65809	8.69748
9	0	0	42.26	7.8525	66.3	3.15184	7.1922
10	0	0	47.5425	6.14563	65.5	2.54807	5.59251
11	0	0	52.825	4.32057	64.7	1.84723	3.90577
12	0	0	58.1075	2.36207	63.9	1.04027	2.12066
END	0	0	63.39	0	0	0	0
GND	18.7	51.4	0	27.3859	6.5	27.2082	3.11507
14	18.7	51.4	5.31583	28.2383	3.8	28.1765	1.86772
15	18.7	51.4	10.6317	28.2526	2.2	28.232	1.07773
16	18.7	51.4	15.9475	27.6742	.9	27.6706	.449238
17	18.7	51.4	21.2633	26.5395	359.9	26.5395	-.0499339
18	18.7	51.4	26.5792	24.876	359.	24.8723	-.431492
19	18.7	51.4	31.895	22.7116	358.2	22.7008	-.700525
20	18.7	51.4	37.2108	20.0774	357.5	20.0589	-.860033
21	18.7	51.4	42.5267	17.0056	356.9	16.9811	-.912394
22	18.7	51.4	47.8425	13.5257	356.4	13.4984	-.859559
23	18.7	51.4	53.1583	9.65248	355.8	9.62691	-.702155
24	18.7	51.4	58.4742	5.35198	355.3	5.33418	-.436144
END	18.7	51.4	63.79	0	0	0	0
GND	30.6	100.2	0	5.61917	128.3	-3.48571	4.40737
26	30.6	100.2	5.1075	5.14158	136.1	-3.70576	3.56414
27	30.6	100.2	10.215	4.80872	141.5	-3.76572	2.99052
28	30.6	100.2	15.3225	4.48217	146.3	-3.72846	2.48765
29	30.6	100.2	20.43	4.13824	150.5	-3.60325	2.0351
30	30.6	100.2	25.5375	3.76552	154.4	-3.39612	1.62651
31	30.6	100.2	30.645	3.3582	158.	-3.11266	1.2605
32	30.6	100.2	35.7525	2.91358	161.2	-2.75864	.937482
33	30.6	100.2	40.86	2.43097	164.3	-2.34007	.658529
34	30.6	100.2	45.9675	1.91037	167.2	-1.86253	.424821
35	30.6	100.2	51.075	1.35051	169.9	-1.32948	.237378
36	30.6	100.2	56.1825	.74383	172.5	-.737498	.0968453
END	30.6	100.2	61.29	0	0	0	0
GND	-88.6	38.9	0	6.79898	133.8	-4.703	4.90999
38	-88.6	38.9	5.26583	7.0532	136.4	-5.11021	4.86141
39	-88.6	38.9	10.5317	7.08249	138.	-5.26073	4.74198
40	-88.6	38.9	15.7975	6.95842	139.2	-5.26423	4.55055
41	-88.6	38.9	21.0633	6.69107	140.1	-5.13548	4.2892
42	-88.6	38.9	26.3292	6.28744	141.	-4.88283	3.96105
43	-88.6	38.9	31.595	5.7544	141.7	-4.51315	3.56996
44	-88.6	38.9	36.8608	5.09933	142.3	-4.0332	3.12034
45	-88.6	38.9	42.1267	4.32984	142.8	-3.4497	2.6167
46	-88.6	38.9	47.3925	3.45269	143.3	-2.76859	2.06301
47	-88.6	38.9	52.6583	2.47072	143.8	-1.99257	1.46087
48	-88.6	38.9	57.9242	1.37418	144.2	-1.11405	.804532
END	-88.6	38.9	63.19	0	0	0	0
GND	-76.7	97.9	0	1.08983	20.2	1.02281	.376282
50	-76.7	97.9	5.24083	.656952	19.4	.619619	.218309

51	-76.7	97.9	10.4817	.382381	18.4	.362937	.120382
52	-76.7	97.9	15.7225	.16304	15.8	.156879	.0443958
53	-76.7	97.9	20.9633	.0165126	238.4	-8.65E-03	-.0140645
54	-76.7	97.9	26.2042	.148363	202.6	-.137014	-.0569102
55	-76.7	97.9	31.445	.244657	200.4	-.229304	-.085304
56	-76.7	97.9	36.6858	.302919	199.3	-.285857	-.100229
57	-76.7	97.9	41.9267	.323465	198.5	-.306738	-.10267
58	-76.7	97.9	47.1675	.306489	197.8	-.291836	-.093633
59	-76.7	97.9	52.4083	.251718	197.1	-.240578	-.0740581
60	-76.7	97.9	57.6492	.157202	196.4	-.150776	-.0444863
END	-76.7	97.9	62.89	0	0	0	0

Sampling System Measurements - WXKS

Impedance measurements were made of the antenna monitor sampling system using a Hewlett-Packard 4396B network analyzer and a Tunwall Radio directional coupler in a calibrated measurement system. The measurements were made looking into the antenna monitor ends of the sampling lines with the sampling loops connected. As was the case for the 2009 proof of performance on which the present station license is based, the measurements were made at 1210 KHz – offset from the carrier frequency, 1200 KHz – in order to not have the impedance magnitudes exceed 200 Ohms.

Tower	1210 KHz Measured Impedance with Sampling Loop Connected Now (Ohms)	1210 KHz Measured Impedance with Sampling Loop Connected 2009 Proof (Ohms)
1	38.6 –j 156.5	39.0 –j 155.6
2	40.7 –j 159.3	41.0 –j 158.3
3	40.6 –j 159.8	40.8 –j 158.7
4	39.9 –j 157.4	39.6 –j 156.3
5	39.2 –j 156.0	39.3 –j 154.6

The measurements were made under very cold conditions – with an outdoor temperature of approximately 10 degrees Fahrenheit – and some slight difference in electrical length from what was the case for the 2009 measurements – which were made under warmer conditions - might be expected. Nonetheless, the measured impedances for each tower agree with those that were made for the 2009 proof of performance within +/- 2 ohms and +/- 4 percent for resistance and reactance and they may, therefore, be considered identical for purposes of the analysis that is required for a Method of Moments proof.

As the complete sampling system, with the loops connected, has the same measured characteristics as it did when measurements were done on the sampling lines separately two years ago, the sampling loops on the towers were not disconnected for further measurements. It is undesirable to open the connectors of a sampling system that are waterproofed outdoors, and that is one of the reasons that only measurements with loops connected are required to confirm that a sampling system continues to function

correctly for recertification purposes after a Method of Moments proof has been run. No repairs or changes have been made to the sampling system since the original 2009 proof was run. It is requested that the antenna monitor sampling system of the WXKS array be considered to be functioning as it was shown to be in the 2009 proof. A waiver of the sampling line measurement requirements contained in Section 73.151(c)(2)(i) of the Rules is requested, if necessary.

Reference Field Strength Measurements - WXKS

Reference field strength measurements were made using a Potomac Instruments field strength meter of known calibration at three locations along radials at the azimuths with radiation values specified on the construction permit and, additionally, on the major lobe radial for the daytime directional antenna pattern. The measured field strengths and descriptions and GPS coordinates for the reference measurement points are shown on the following page.

Reference Field Strength Measurements

WXKS DA-Day

Radial (Deg.)	Point	Distance (Km)	Field (mV/m)	Coordinates (NAD 27)		Description
				N	W	
40	1	2.19	272	42-18-14.3	71-10-19.4	SE end of Harwich Drive at confluence of 3 private driveways
	2	4.87	277	42-19-20.2	71-09-02.9	Center of Partridge Street 50 feet east of Singletree Street
	3	6.48	161	42-20-01.0	71-08-19.2	Center of Clinton Road in front of door #129
119.5	1	2.82	374	42-16-38.0	71-09-37.7	Northwest corner Alaric Street and Centre Street
	2	3.56	203	42-16-24.3	71-09-05.0	Center of Curlew Street in front of #6
	3	3.82	184	42-16-21.0	71-08-54.3	Center of Partridge Street in front of #82
248.5	1	1.78	303	42-16-58.0	71-12-33.0	Center of Bird Street in front of #63
	2	2.12	162	42-16-56.3	71-12-47.8	Southwest corner, Woodbury and Audrey
	3	2.39	220	42-16-51.7	71-12-58.3	East side Hillcrest Road at driveway to #135

All measurements were taken on February 8, 2011 with Potomac Instruments FIM-4100 serial number 133 field strength meter.

Spurious Emission Measurements

February 9, 2011

Notes on Boston Intermod Measurements

Measurements made with Potomac FIM 4100 SN #133

Measurements made on access road to Brook Farm Historical Site at edge of road by brick and stone wall.

42° 17' 25.1° N
71° 10' 40.5° W

Unable to make measurements of field strengths emitted from the transmitter site on frequencies of 800, 1060 and 1460 kilohertz because of signals from other stations on those frequencies.

John Warner

WXKS

FREQUENCY (kHz)	FIELD (mV/m)	EMISSION LEVEL (dB)			
	Day				
1200	1790				
2400	.051	-90.9			
3600	.046	-91.8			
4800	.040	-93.0			
540	.075	-87.6			
660	.108	-84.4			
800	*				
930	.111	-84.2			
1060	*				
1070	.110	-84.2			
1460	*				
1470	.114	-83.9			
1730	.079	-87.1			
1740	.055	-90.2			
1860	.029	-95.8			
1870	.097	-85.3			

* Unreadable due to interference

Elimination of Construction Permit Condition 4 - WXKS

The following inquiry was made, by e-mail, of the FCC staff on January 13, 2011 and approval was given to eliminate the requirements of CP condition 4 by return e-mail on January 19, 2011:

**** Beginning of January 13, 2011 message from Ronald D. Rackley to FCC staff ****

I come to you today with a question about how to handle a CP condition that I do not believe is appropriate for the situation it is supposed to address. I assume you are the person to ask, as the application for license for the directional antenna pattern specified by the CP is going to employ an MoM proof of performance. If I am incorrect in that assumption, please advise me as to whom I should contact at the FCC with regard to my question.

The CP in question, BP-20100917ABA, authorizes minor changes to the daytime directional antenna pattern of WXKS, Newton, MA (on 1200 KHz). The transmitter site is shared with stations WRCA (on 1330 KHz) and WUNR (on 1600 KHz). All three stations were newly licensed based on Form 302 applications using MoM proofs less than two years ago in 2009.

The array has five equal-height towers. Each tower has filters to provide an isolated base port for each of the three frequencies, with each port connected to either an antenna matching unit or detuning reactance depending on whether the tower is used as a directional antenna element or detuned at a given frequency. The five towers have identical sampling loops and sampling lines and each station employs an antenna monitor with internal filtering.

The permit authorizes modification of the WXKS daytime directional antenna system to add one unused tower of the existing five to the three towers of the presently licensed daytime pattern. The daytime phasing and coupling system will be modified to connect the isolated base port of that tower to an antenna matching unit that is in turn connected to the phasor cabinet, in place of the detuning reactance that is now connected to the base port. No changes will be made beyond the isolated base ports. The filters will remain as they have been since the three stations were first licensed there and no changes will be made to the towers or antenna monitor sampling system. No physical changes will be made near the tower bases. The change to the WXKS daytime antenna system will have no impact on the licensed WRCA and WUNR facilities.

The construction permit contains a special operating condition, number 4, that states:

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 WXKS, WRCA (ID# 60695), and WUNR (ID# 10118), and there shall be filed with the license application copies of a firm agreement entered into by the three 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, all three stations shall each measure antenna or common point resistance and submit FCC Form 302 as application notifying the return to direct measurement of power.

The filters will remain unchanged and no revision to the "firm agreement" between the three stations regarding their maintenance that was required when they were first licensed will be necessary. No adjustment changes that could impact the operating parameters or common point resistances of the WRCA and WUNR antenna systems will be made. It will not be necessary for WRCA or WUNR to file FCC Form 302 applications to return to direct measurement of power.

I believe that the requirements of condition 4 of the WXKS CP can be completely eliminated. Do you agree?

Cordially,

Ron Rackley

**** End of January 13, 2011 message from Ronald D. Rackley to FCC staff ****