

EXHIBIT A

ENGINEERING STATEMENT

The engineering data contained herein have been prepared on behalf of SOUTH CENTRAL COMMUNICATIONS CORP., licensee of WMAK (FM), Murfreesboro, Tennessee, in support of its application for license to cover BPH-20001012AAX.

Exhibit A is a complete proof-of-performance on the new directional antenna, conducted by the manufacturer, ERI. Exhibit B is a statement by a licensed surveyor confirming the proper orientation of the antenna, and Exhibit C is a statement attesting to the proper installation of the antenna.

Because the antenna is mounted on one corner of a candelabra, in violation of Section 73.316 (c)(2)(vi), WMAK sought a waiver of that rule, in support of which it proposed to further reduce radiation toward adjacent-channel WSTO, Owensboro, Kentucky, so that the anticipated re-radiation from the other tower elements could not cause the actual radiation to exceed the theoretical values. Exhibit D is a tabulation of the relative field values toward WSTO from the application and from the proof-of-performance. As indicated, the measured values are below the proposed values, meaning that WSTO will continue to be properly protected.

I declare under penalty of perjury that the foregoing statements and the attached exhibits are true and correct to the best of my knowledge and belief.


NEIL M. SMITH

May 1, 2002

ERI[®] Electronics Research, Inc.

Electronics Research, Inc. 7777 Gardner Rd. Chandler, In 47610 Phone (812) 925-6000 Fax (812) 925-4030 <http://www.eriinc.com/>

Directional Antenna System For WMAK, Murfreesboro, Tennessee

August 7, 2001

Electronics Research Inc. is providing a custom fabricated antenna system that is specially designed to meet the FCC requirements and the general needs of radio station WMAK.

The antenna is the ERI model MP-8AC-DA-HW configuration. The circular polarized system consists of 8 half-wavelength spaced bays using one driven circular polarized radiating element per bay, two horizontal parasitic elements per bay and two vertical parasitic elements interleaved between alternate bay pairs. The antenna was tested on a 14" o.d. pole, which is the structure the station plans to use to support the array. All tests were performed on a frequency of 96.3 megahertz which is the center of the FM broadcast channel assigned to WMAK.

Pattern measurements were made on a sixty-acre antenna pattern range which is owned and operated by Electronics Research, Inc. The tests were performed under the direction of Thomas B. Silliman, president of Electronics Research, Inc. Mr. Silliman has the Bachelor of Electrical Engineering and the Master of Electrical Engineering degrees from Cornell University and is a registered professional engineer in the states of Indiana, Maryland and Minnesota.

Directional Antenna System For WMAK, Murfreesboro, Tennessee

(Continued)

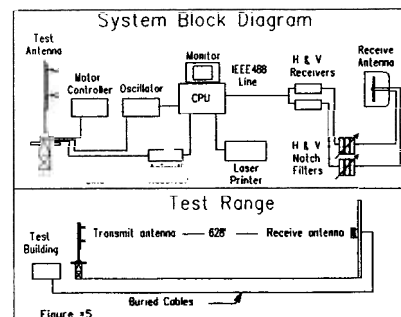
The test antenna consisted of two bay levels of the circular polarized system with the associated horizontal and vertical parasitic elements. The elements and brackets that were used in this test are electrically equivalent to those that will be supplied with the antenna. A section of 3 1/8 inch o.d. rigid coaxial line was used to feed the test antenna, and a section of 3 1/8 inch o.d. rigid outer conductor only was attached above the test antenna. The lines were properly grounded during all tests.

The power distribution and phase relationship to the antenna elements was adjusted in order to achieve the directional radiation patterns for both horizontal and vertical polarization components.

The proof-of-performance was accomplished using a 14" o.d. pole with identical dimension and configuration including all braces, ladders, conduits, coaxial lines and other appurtenances that are included in the actual aperture at which the antenna will be installed. The structure was erected vertically on a turntable mounted on a non-metallic building with the antenna centered vertically on the structure, making the center of radiation of the test approximately 30 feet above ground. The turntable is equipped with a motor drive and azimuth indicating mechanism, resolution of this azimuth measuring device is one-tenth of a degree.

The antenna under test was operated in the transmitting mode and fed from a Wavetek Model 3000 signal generator. The frequency of the signal source was set at 96.3 MHz and was constantly monitored by an Anritsu Model ML521B measuring receiver.

A broad-band horizontal and vertical dipole system, located approximately 628 feet from the test antenna, was used to receive the emitted test signals. The dipole system was mounted at the same height above terrain as the center of the antenna under test. The signals received by the dipole system were fed to the test building by way of two buried Heliax cables to an Anritsu Model ML521B measuring receiver. This data was interfaced to a Hewlett-Packard Laser Jet 4P printer by means of a pentium computer system. Relative field strength was plotted as a function of azimuth.



Directional Antenna System
For
WMAK, Murfreesboro, Tennessee

(Continued)

The measurements were performed by rotating the test antenna in a counter-clockwise direction and plotting the received signal on polar coordinated graph paper in a clockwise direction. Both horizontal and vertical components were recorded separately.

CONCLUSIONS

The circular polarized system consists of 8 half-wavelength spaced bays using one driven circular polarized radiating element per bay, two horizontal parasitic elements per bay and two vertical parasitic elements interleaved between alternate bay pairs. The power distribution and phase relationship will be fixed when antenna is manufactured. Proper maintenance of the elements should be all that is required to maintain the pattern in adjustment.

The MP-8AC-DA-HW array is to be mounted on the North 162 degrees East tower of the 14" o.d. pole at a bearing of North 162 degrees East. Blue prints provided with the antenna will show the proper antenna orientation alignment. The antenna alignment procedure should be directed by a licensed surveyor as prescribed by the FCC.

Figure #1 represents the maximum value of either the horizontal or vertical component at any azimuth. The measured horizontal plane relative field pattern, for both the horizontal and vertical polarization components, is shown on Figure #2 attached. The actual measured pattern does not exceed the authorized FCC composite pattern at any azimuth. A calculated vertical plane relative field pattern is shown on Figure #3 attached. The power in the maximum will reach 39 kilowatts (15.911 dBk).

The power at North 320 degrees East does not exceed 1.95 kilowatts (2.9 dBk).

The RMS of the vertically polarized horizontal plane component does not exceed the RMS of the horizontally polarized horizontal plane component.

The composite horizontal and vertical maximum relative field pattern obtained from the measured data as shown on Figure #1 has an RMS that is greater than 85% of the filed composite pattern.

The clear vertical length of the structure required to support the antenna is 51 feet if the antenna is to be top mounted.

**Directional Antenna System
For
WMAK, Murfreesboro, Tennessee**

(Continued)

No obstructions other than those that are specified by the blue prints supplied with the antenna are to be mounted within 75 ft. horizontally of the system. The vertical distance to the nearest obstruction should be a minimum of 10 ft. from the directional antenna. Metallic guy wires should be a minimum distance of forty feet horizontally from the antenna.

ELECTRONICS RESEARCH, INC.

ERI[®] Horizontal Plane Relative Field Pattern

Electronics Research, Inc. 7777 Gardner Rd. Chandler, In 47610 Phone (812) 925-6000 Fax (812) 925-4030 <http://www.eriinc.com/>

FIGURE: 1

STATION: WMAK

LOCATION: MURFREESBORO, TN

ANTENNA TYPE: MP-8AC-DA-HW

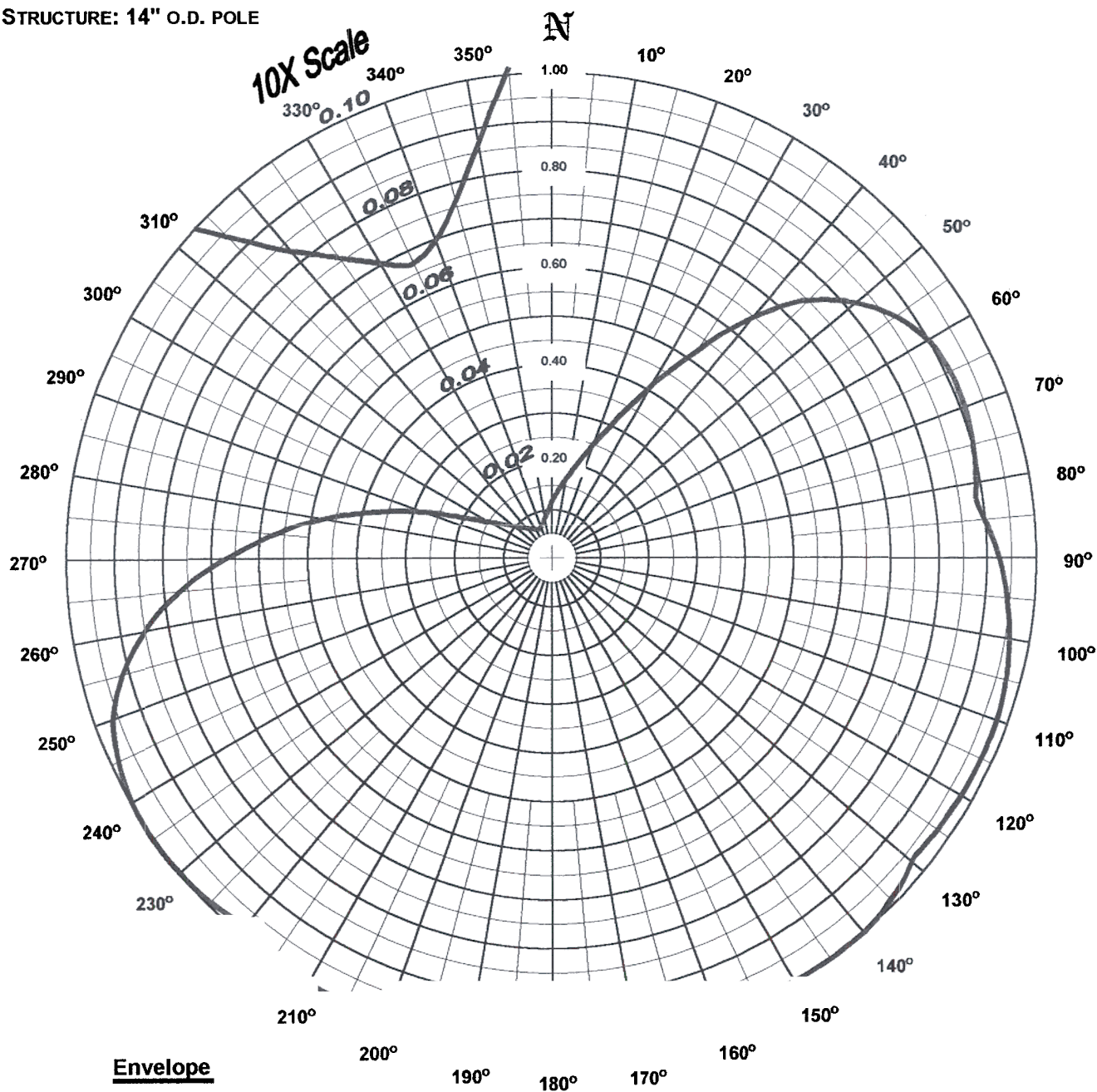
STRUCTURE: 14" O.D. POLE

DATE: 8/7/01

FREQUENCY: 96.3 MHz

ORIENTATION: 162° TRUE

MOUNTING: STANDARD



RMS: 0.777

Maximum: 1.000 @ 142° True

Minimum: 0.068 @ 335° True

COMMENTS: COMPOSITE PATTERN: THIS PATTERN SHOWS THE MAXIMUM OF EITHER THE H OR V AZIMUTH VALUES. THIS PATTERN DOES NOT EXCEED THE FCC FILED COMPOSITE PATTERN AT ANY AZIMUTH. THE RMS OF THIS PATTERN IS GREATER THAN 85% OF THE FILED FCC COMPOSITE PATTERN BMH-20001012AAX

ERI[®] *Horizontal Plane Relative Field List*

Electronics Research, Inc. 7777 Gardner Rd. Chandler, In 47610 Phone (812) 925-6000 Fax (812) 925-4030 <http://www.eriinc.com/>

Station: WMAK
Location: Murfreesboro, TN
Frequency: 96.3 MHz

Antenna: MP-8AC-DA-HW
Orientation: 162° True
Tower: 14" o.d. pole

Figure: 1
Date: 8/7/01
Reference: wmak1m.fig

Angle	Envelope			Polarization	Angle	Envelope			Polarization
	Field	kW	dBk			Field	kW	dBk	
0°	0.121	0.57	-2.45	Horizontal	180°	0.981	37.52	15.74	Vertical
5°	0.144	0.81	-0.94	Horizontal	185°	0.991	38.28	15.83	Vertical
10°	0.172	1.15	0.60	Horizontal	190°	0.997	38.77	15.88	Vertical
15°	0.208	1.69	2.27	Horizontal	195°	1.000	38.99	15.91	Vertical
20°	0.255	2.55	4.06	Horizontal	200°	1.000	39.00	15.91	Vertical
25°	0.325	4.11	6.14	Horizontal	205°	1.000	39.00	15.91	Vertical
30°	0.417	6.78	8.31	Horizontal	210°	1.000	39.00	15.91	Vertical
35°	0.529	10.93	10.39	Horizontal	215°	0.997	38.78	15.89	Vertical
40°	0.652	16.59	12.20	Horizontal	220°	0.988	38.04	15.80	Vertical
45°	0.757	22.34	13.49	Horizontal	225°	0.991	38.26	15.83	Horizontal
50°	0.823	26.44	14.22	Horizontal	230°	0.998	38.84	15.89	Horizontal
55°	0.871	29.61	14.71	Horizontal	235°	1.000	39.00	15.91	Horizontal
60°	0.901	31.66	15.00	Horizontal	240°	0.996	38.71	15.88	Horizontal
65°	0.912	32.44	15.11	Horizontal	245°	0.983	37.72	15.77	Horizontal
70°	0.909	32.25	15.09	Horizontal	250°	0.961	36.05	15.57	Horizontal
75°	0.902	31.76	15.02	Horizontal	255°	0.916	32.72	15.15	Horizontal
80°	0.891	30.96	14.91	Horizontal	260°	0.853	28.37	14.53	Horizontal
85°	0.900	31.57	14.99	Vertical	265°	0.772	23.27	13.67	Horizontal
90°	0.925	33.33	15.23	Vertical	270°	0.674	17.73	12.49	Horizontal
95°	0.945	34.80	15.42	Vertical	275°	0.576	12.94	11.12	Horizontal
100°	0.960	35.93	15.55	Vertical	280°	0.484	9.12	9.60	Horizontal
105°	0.970	36.72	15.65	Vertical	285°	0.384	5.74	7.59	Horizontal
110°	0.976	37.16	15.70	Vertical	290°	0.294	3.36	5.27	Horizontal
115°	0.977	37.23	15.71	Vertical	295°	0.211	1.74	2.40	Horizontal
120°	0.975	37.06	15.69	Vertical	300°	0.160	1.00	0.01	Horizontal
125°	0.971	36.74	15.65	Vertical	305°	0.131	0.67	-1.75	Horizontal
130°	0.969	36.63	15.64	Horizontal	310°	0.110	0.47	-3.27	Horizontal
135°	0.989	38.14	15.81	Horizontal	315°	0.095	0.35	-4.57	Horizontal
140°	0.999	38.91	15.90	Horizontal	320°	0.083	0.27	-5.67	Vertical
145°	1.000	39.00	15.91	Horizontal	325°	0.076	0.23	-6.44	Vertical
150°	0.999	38.91	15.90	Horizontal	330°	0.071	0.20	-7.09	Vertical
155°	0.993	38.44	15.85	Horizontal	335°	0.068	0.18	-7.50	Horizontal
160°	0.982	37.58	15.75	Horizontal	340°	0.070	0.19	-7.19	Horizontal
165°	0.966	36.36	15.61	Horizontal	345°	0.077	0.23	-6.41	Horizontal
170°	0.955	35.56	15.51	Vertical	350°	0.087	0.30	-5.28	Horizontal
175°	0.968	36.51	15.62	Vertical	355°	0.102	0.41	-3.92	Horizontal

Polarization:
Maximum Field: 1.000 @ 142° True
Minimum Field: 0.068 @ 335° True
RMS: 0.777
Maximum ERP: 39.000 kW
Maximum Power Gain: 4.390 (6.425 dB)

Total Input Power: 8.883 kW

ERI[®] Horizontal Plane Relative Field Pattern

Electronics Research, Inc. 7777 Gardner Rd. Chandler, In 47610 Phone (812) 925-6000 Fax (812) 925-4030 <http://www.eriinc.com/>

FIGURE NO: 2

STATION: WMAK

LOCATION: MURFREESBORO, TN

ANTENNA: MP-8AC-DA-HW

STRUCTURE: 14" O.D. POLE

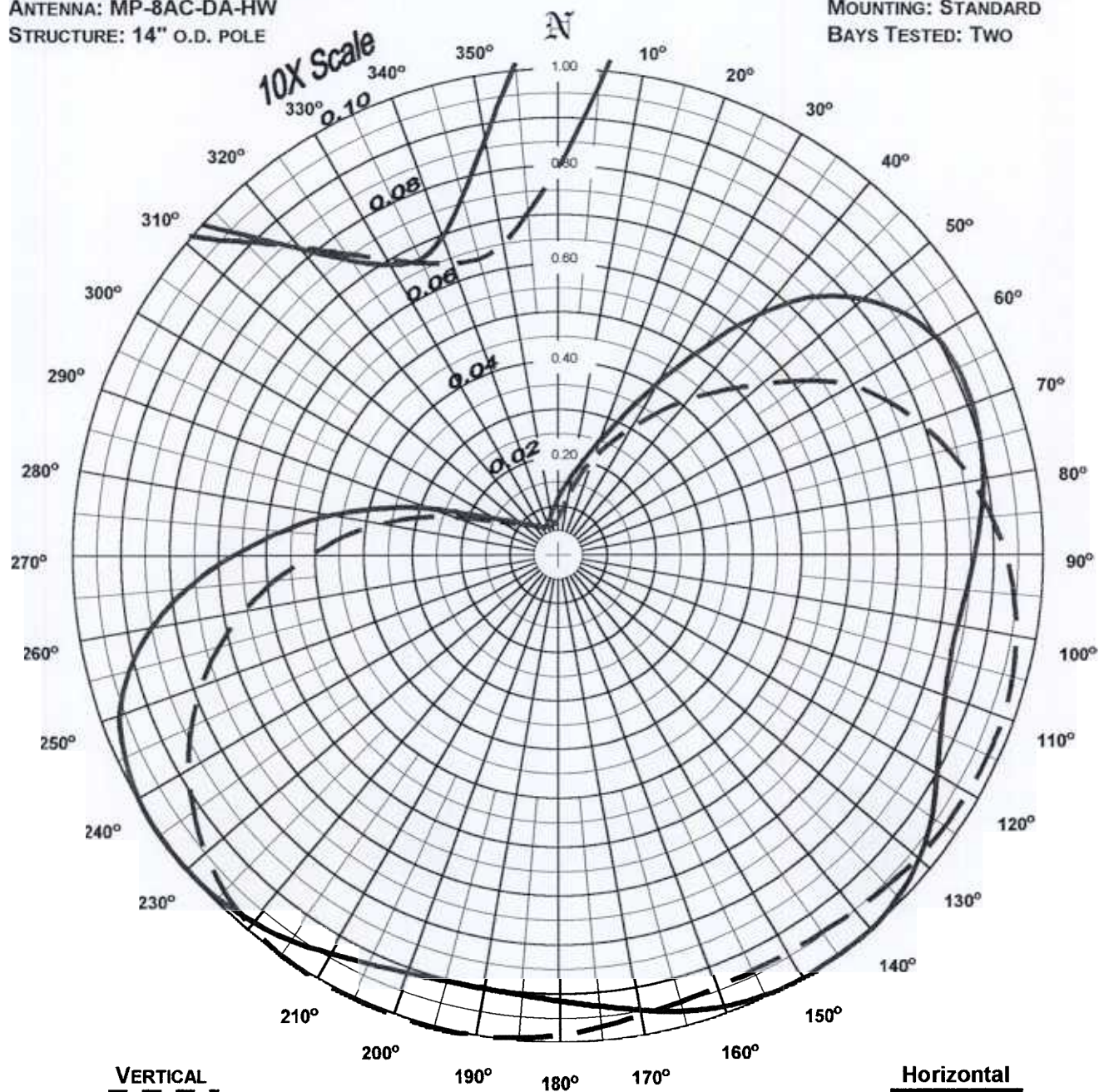
DATE: 8/7/01

FREQUENCY: 96.3 MHz

ORIENTATION: 162° TRUE

MOUNTING: STANDARD

BAYS TESTED: TWO



RMS: 0.724

MAXIMUM: 1.000 @ 196° TRUE

MINIMUM: 0.063 @ 345° TRUE

RMS: 0.752

Maximum: 1.000 @ 142° True

Minimum: 0.068 @ 335° True

COMMENTS: MEASURED PATTERNS OF THE HORIZONTAL AND VERTICAL COMPONENTS.

ERI[®] Horizontal Plane Relative Field List

Electronics Research, Inc. 7777 Gardner Rd. Chandler, In 47610 Phone (812) 925-6000 Fax (812) 925-4030 <http://www.eriinc.com/>

Station: WMAK
Location: Murfreesboro, TN
Frequency: 96.3 MHz

Antenna: MP-8AC-DA-HW
Orientation: 162° True
Tower: 14" o.d. pole

Figure: 2
Date: 8/7/01
Reference: wmak1m.fig

Angle	Horizontal			Vertical			Angle	Horizontal			Vertical		
	Field	kW	dBk	Field	kW	dBk		Field	kW	dBk	Field	kW	dBk
0°	0.121	0.57	-2.45	0.080	0.25	-6.01	180°	0.911	32.39	15.10	0.981	37.52	15.74
5°	0.144	0.81	-0.94	0.097	0.37	-4.34	185°	0.902	31.75	15.02	0.991	38.28	15.83
10°	0.172	1.15	0.60	0.130	0.66	-1.83	190°	0.898	31.46	14.98	0.997	38.77	15.88
15°	0.208	1.69	2.27	0.173	1.17	0.67	195°	0.900	31.60	15.00	1.000	38.99	15.91
20°	0.255	2.55	4.06	0.219	1.87	2.71	200°	0.907	32.12	15.07	1.000	39.00	15.91
25°	0.325	4.11	6.14	0.260	2.64	4.21	205°	0.920	33.02	15.19	1.000	39.00	15.91
30°	0.417	6.78	8.31	0.308	3.71	5.69	210°	0.938	34.32	15.36	1.000	39.00	15.91
35°	0.529	10.93	10.39	0.364	5.18	7.14	215°	0.960	35.94	15.56	0.997	38.78	15.89
40°	0.652	16.59	12.20	0.425	7.03	8.47	220°	0.978	37.29	15.72	0.988	38.04	15.80
45°	0.757	22.34	13.49	0.485	9.16	9.62	225°	0.991	38.26	15.83	0.971	36.77	15.65
50°	0.823	26.44	14.22	0.553	11.92	10.76	230°	0.998	38.84	15.89	0.948	35.01	15.44
55°	0.871	29.61	14.71	0.631	15.53	11.91	235°	1.000	39.00	15.91	0.917	32.80	15.16
60°	0.901	31.66	15.00	0.702	19.20	12.83	240°	0.996	38.71	15.88	0.880	30.19	14.80
65°	0.912	32.44	15.11	0.753	22.09	13.44	245°	0.983	37.72	15.77	0.836	27.23	14.35
70°	0.909	32.25	15.09	0.796	24.74	13.93	250°	0.961	36.05	15.57	0.784	24.00	13.80
75°	0.902	31.76	15.02	0.836	27.23	14.35	255°	0.916	32.72	15.15	0.726	20.58	13.13
80°	0.891	30.96	14.91	0.870	29.52	14.70	260°	0.853	28.37	14.53	0.662	17.07	12.32
85°	0.875	29.87	14.75	0.900	31.57	14.99	265°	0.772	23.27	13.67	0.590	13.56	11.32
90°	0.858	28.70	14.58	0.925	33.33	15.23	270°	0.674	17.73	12.49	0.515	10.32	10.14
95°	0.845	27.83	14.44	0.945	34.80	15.42	275°	0.576	12.94	11.12	0.449	7.87	8.96
100°	0.836	27.25	14.35	0.960	35.93	15.55	280°	0.484	9.12	9.60	0.381	5.65	7.52
105°	0.836	27.26	14.35	0.970	36.72	15.65	285°	0.384	5.74	7.59	0.309	3.71	5.70
110°	0.848	28.04	14.48	0.976	37.16	15.70	290°	0.294	3.36	5.27	0.241	2.26	3.54
115°	0.870	29.50	14.70	0.977	37.23	15.71	295°	0.211	1.74	2.40	0.181	1.28	1.09
120°	0.901	31.69	15.01	0.975	37.06	15.69	300°	0.160	1.00	0.01	0.144	0.81	-0.90
125°	0.939	34.42	15.37	0.971	36.74	15.65	305°	0.131	0.67	-1.75	0.120	0.56	-2.53
130°	0.969	36.63	15.64	0.964	36.26	15.59	310°	0.110	0.47	-3.27	0.104	0.42	-3.79
135°	0.989	38.14	15.81	0.956	35.63	15.52	315°	0.095	0.35	-4.57	0.092	0.33	-4.82
140°	0.999	38.91	15.90	0.948	35.06	15.45	320°	0.083	0.27	-5.71	0.083	0.27	-5.67
145°	1.000	39.00	15.91	0.943	34.66	15.40	325°	0.075	0.22	-6.63	0.076	0.23	-6.44
150°	0.999	38.91	15.90	0.939	34.41	15.37	330°	0.069	0.19	-7.26	0.071	0.20	-7.09
155°	0.993	38.44	15.85	0.938	34.31	15.35	335°	0.068	0.18	-7.50	0.067	0.17	-7.60
160°	0.982	37.58	15.75	0.940	34.47	15.37	340°	0.070	0.19	-7.19	0.064	0.16	-7.92
165°	0.966	36.36	15.61	0.946	34.88	15.43	345°	0.077	0.23	-6.41	0.063	0.16	-8.05
170°	0.945	34.80	15.42	0.955	35.56	15.51	350°	0.087	0.30	-5.28	0.065	0.17	-7.77
175°	0.925	33.40	15.24	0.968	36.51	15.62	355°	0.102	0.41	-3.92	0.071	0.20	-7.06

Polarization:
Maximum Field:
Minimum Field:
RMS:
Maximum ERP:
Maximum Power Gain:

Vertical
1.000 @ 196° True
0.063 @ 345° True
0.724
39.000 kW
4.390 (6.425 dB)

Total Input Power: 8.883 kW

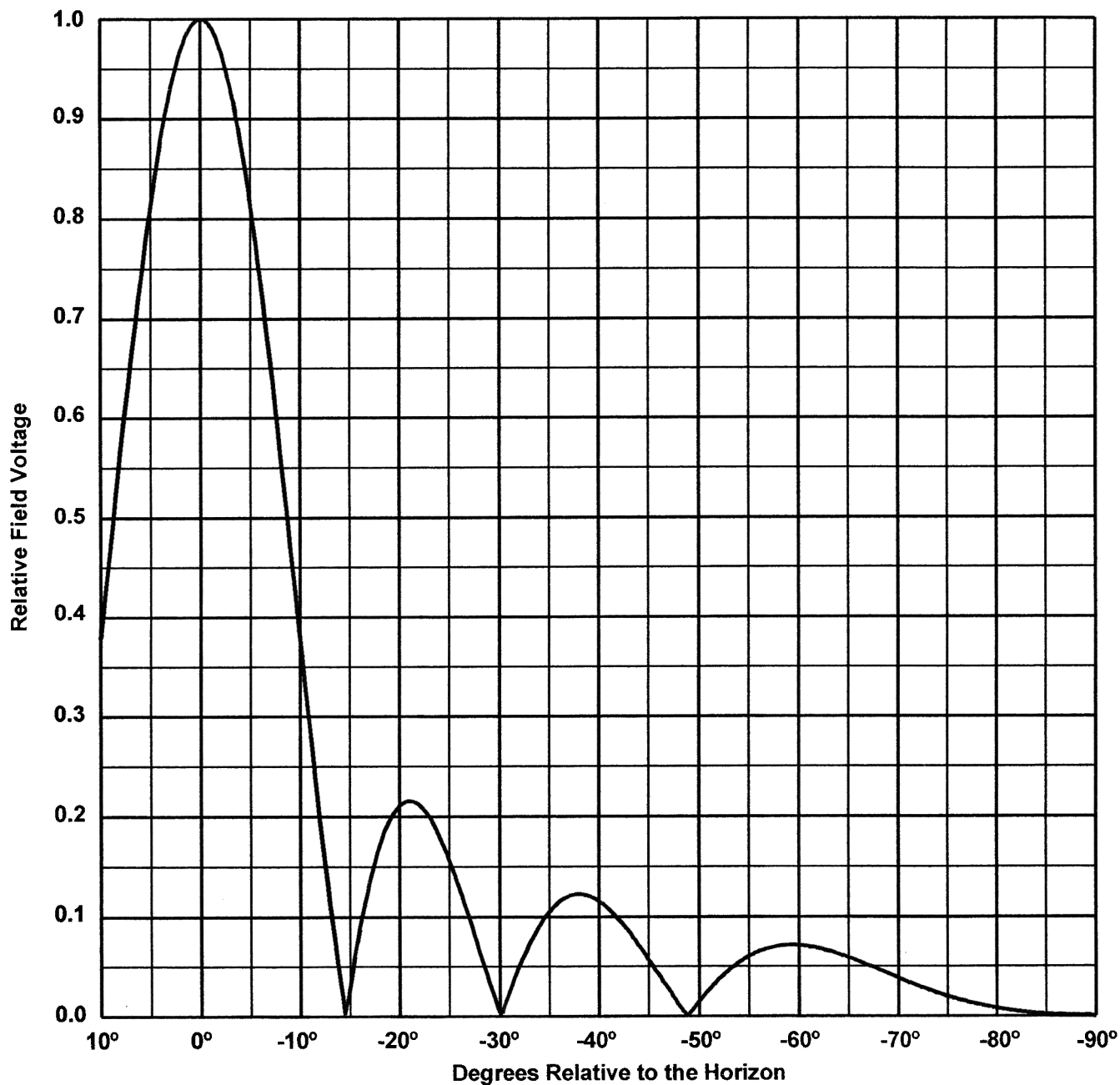
ERI[®] *Vertical Plane Relative Field Pattern*

WMAK, Murfreesboro, TN, 96.3 MHz

Figure#: 3

Date: 8/7/01

An 8 level, .5 wave-length spaced MP-8AC-DA-HW directional antenna with 0° beam tilt, 0% null fill and a H/V maximum power ratio of 1.000



Vertical Polarization Gain:

Maximum: 4.390 (6.425 dB)
Horizontal Plane: 4.390 (6.425 dB)

Horizontal Polarization Gain:

Maximum: 4.390 (6.425 dB)
Horizontal Plane: 4.390 (6.425 dB)

Directional Antenna System For WMAK, Murfreesboro, Tennessee

(Continued)

ANTENNA SPECIFICATIONS

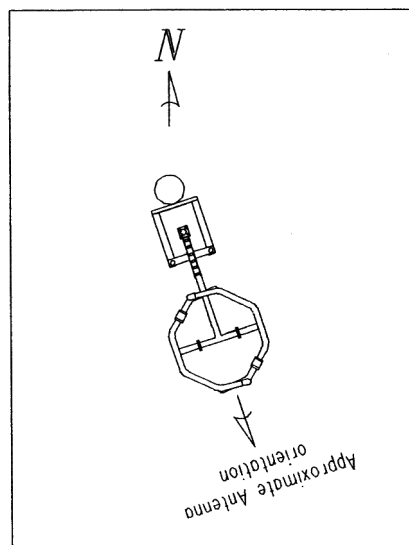
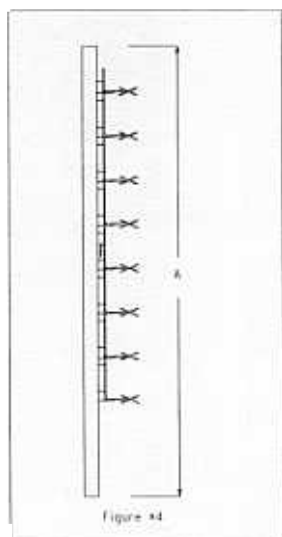
Antenna Type: MP-8AC-DA-HW
Frequency: 96.3 MHz
Number of Bays: 8

MECHANICAL SPECIFICATIONS

Mounting: Standard
System length: 39 ft 4 in
Aperture length required: 51 ft.
Orientation: 162 true
Input flange to the antenna 3 1/8 inch female

ELECTRICAL SPECIFICATIONS (For directional use)

Maximum horizontal ERP: 39 kW (15.911 dBk)
Horizontal maximum power gain: 4.390 (6.425 dB)
Maximum vertical ERP: 39 kW (15.911 dBk)
Vertical maximum power gain: 4.390 (6.425 dB)
Total input power: 8.883 kW (9.486 dBk)



83-054/6314

RAGAN • SMITH
A S S O C I A T E S

PLANNERS • CIVIL ENGINEERS
LANDSCAPE ARCHITECTS • SURVEYORS

April 11, 2002

FEDERAL EXPRESS

Mr. Scott Riley
American Tower
P.O. Box 454
1310 West Beltline Road
Cedar Hill, TX 75104

**RE: ANTENNA ORIENTATION
WMAK-FM (96.3 MHz)
NASHVILLE TOWER SITE**

Dear Mr. Riley:

I hereby state that on April 11, 2002 we checked the alignment of the antenna for radio station WMAK-FM (96.3 MHz) located at North Latitude 36 degrees 15 minutes 49.89 seconds and West Longitude 86 degrees 47 minutes 38.90 seconds and found it to have an azimuth of 162 degrees, based on true north.

If you have questions or need anything further, please call.

Sincerely,

Ragan • Smith Associates, Inc.

David A. Johnson, P.E.
Professional Engineer
Tennessee No. 1352

DAJ:ps

Enclosure

Facility ID : 61053

Call Sign : WMAK

Permit File Number : BPH-20001012AAX

Antenna registration number : 1224078

AFFIDAVIT

Respectfully submitted:

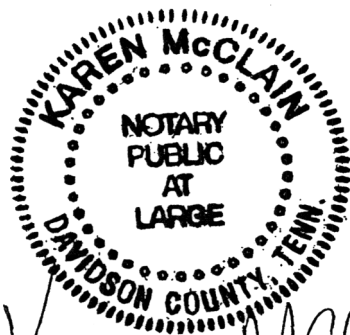
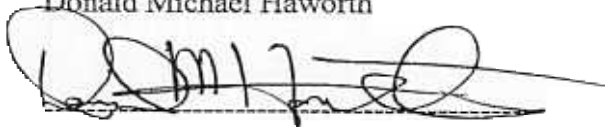
In the matter referenced above, the directional antenna installation has been completed and is in full compliance with parameters as set forth in the Construction Permit.

It is hereby stated that the antenna was installed pursuant to the manufacturer's instructions, under the direct supervision of the signatory of this affidavit.

It is further stated that the undersigned is a licensed engineer: License number PL-17-14051, in the employee of South Central Communications Corporation, licensee of radio station WMAK, and that his qualifications are a matter of record with the Federal Communications Commission

Signed:

Donald Michael Haworth



My Commission Expires MAR. 29, 2003



EXHIBIT DCOMPOSITE RELATIVE FIELD PATTERN
TOWARD WSTO(FM)PROPOSED WMAK(FM)
CHANNEL 242C1 – MURFREESBORO, TENNESSEE

<u>Azimuth</u>	<u>Relative Field</u>	
	<u>Proposed</u>	<u>Measured Envelope</u>
0	0.11	0.083
	0.11	0.076
	0.12	0.071
	0.12	0.068
	0.105	0.070
	0.13	0.077
	0.16	0.087
	0.16	0.102
0	0.17	0.121
5	0.17	0.144