

Federal Communications Commission Washington, D.C. 20554 <p style="text-align: center;">FCC 302-FM</p>	Approved by OMB 3060-0506 (June 2002) FOR FCC USE ONLY
<p>APPLICATION FOR FM BROADCAST STATION LICENSE</p> <p>Read INSTRUCTIONS Before Filling Out Form</p>	FOR COMMISSION USE ONLY FILE NO. BLEDD - 20031230AAP

Section I - General Information

1.	Legal Name of the Applicant MINNESOTA PUBLIC RADIO		
	Mailing Address 45 EAST 7TH STREET		
	City ST. PAUL	State or Country (if foreign address) MN	ZIP Code 55101 -
	Telephone Number (include area code) 6512901259	E-Mail Address (if available) MGRAMLING@MPR.ORG	
	FCC Registration Number: 0002642510	Call Sign KNSE	Facility Identifier 90889
2.	Contact Representative (if other than Applicant) TODD STANSBURY		Firm or Company Name WILEY REIN & FIELDING
	Telephone Number (include area code) 2027194948	E-Mail Address (if available) TSTANSBU@WRF.COM	
3.	If this application has been submitted without a fee, indicate reason for fee exemption (see 47 C.F.R. Section 1.1114): <input type="radio"/> Governmental Entity <input checked="" type="radio"/> Noncommercial Educational Licensee/Permittee <input type="radio"/> Other		
4.	Facility Information:		
	a. <input type="radio"/> Commercial <input checked="" type="radio"/> Noncommercial		
	b. <input checked="" type="radio"/> Directional <input type="radio"/> Nondirectional		
	c. Community of License:		
	City: AUSTIN	State: MN	
5.	Program Test Authority:		
	<input checked="" type="radio"/> Requesting program test authority.		
	<input type="radio"/> Station operating pursuant to automatic program test authority (47 C.F.R. Section 73.1620(a)(1)).		
6.	Purpose of Application:		
	<input checked="" type="radio"/> Cover construction permit (list most recent construction permit file number -- starts with the prefix BPH, BMPH, BPED, or BMPED):	BPED-19980603MB	
	<input type="radio"/> Modify an authorized license (list license file number -- starts with the prefix BLH, BMLH, BLEDD, or BMLED):	-	
	<input type="radio"/> Amend a pending application If an amendment, submit as an Exhibit a listing by Section and Question Number the portions of the pending application that are being revised.		[Exhibit 1]

NOTE: In addition to the information called for in this section, an explanatory exhibit providing full particulars must be submitted for each question for which a "No" response is provided.

Section II - Legal and Financial

<p>1. Certification. Applicant certifies that it has answered each question in this application based on its review of the application instructions and worksheets. Applicant further certifies that where it has made an affirmative certification below, this certification constitutes its representation that the application satisfies each of the pertinent standards and criteria set forth in the application instructions and worksheets.</p>	<p><input checked="" type="radio"/> Yes <input type="radio"/> No</p>
<p>2. Licensee/Permittee certifies that all terms, conditions, and obligations set forth in the underlying construction permit have been fully met.</p>	<p><input checked="" type="radio"/> Yes <input type="radio"/> No See Explanation in [Exhibit 2]</p>
<p>3. Licensee/Permittee certifies that, apart from changes already reported, no cause or circumstance has 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.</p>	<p><input checked="" type="radio"/> Yes <input type="radio"/> No See Explanation in [Exhibit 3]</p>
<p>4. Character Issues. Applicant certifies that neither licensee/permittee nor any party to the application has or has had any interest in, or connection with: a.any broadcast application in any proceeding where character issues were left unresolved or were resolved adversely against the applicant or party to the application; or b.any pending broadcast application in which character issues have been raised.</p>	<p><input checked="" type="radio"/> Yes <input type="radio"/> No See Explanation in [Exhibit 4]</p>
<p>5. Adverse Findings. Applicant certifies that, with respect to the applicant and any party to the application, no adverse finding has been made, nor has an adverse final action been taken related to the following: any felony; mass media-related antitrust or unfair competition; fraudulent statements to another governmental unit; or discrimination.</p>	<p><input checked="" type="radio"/> Yes <input type="radio"/> No See Explanation in [Exhibit 5]</p>
<p>6. Anti-Drug Abuse Act Certification. Applicant certifies that neither licensee/permittee nor any party to the application is subject to denial of federal benefits pursuant to Section 5301 of the Anti-Drug Abuse Act of 1988, 21 U.S.C. Section 862.</p>	<p><input checked="" type="radio"/> Yes <input type="radio"/> No</p>

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. I acknowledge that all certifications and attached Exhibits are considered material representations. I hereby waive any claim to the use of any particular frequency as against the regulatory power of the United States because of the previous use of the same, whether by license or otherwise, and request an authorization in accordance with this application. (See Section 304 of the Communications Act of 1934, as amended.)

<p>Typed or Printed Name of Person Signing THOMAS J KIGIN</p>	<p>Typed or Printed Title of Person Signing EXECUTIVE VICE PRESIDENT</p>
<p>Signature</p>	<p>Date 12/30/2003</p>

SECTION III - PREPARER'S CERTIFICATION

I certify that I have prepared Section III (Engineering data) on behalf of the applicant, and that after such preparation, I have examined and found it to be accurate and true to the best of my knowledge and belief.

<p>Name RALPH HORNBERGER</p>	<p>Relationship to Applicant (e.g., Consulting Engineer) SENIOR DESIGN ENGINEER</p>	
<p>Signature</p>	<p>Date 12/30/2003</p>	
<p>Mailing Address 45 EAST 7TH ST.</p>		
<p>City</p>	<p>State or Country (if foreign address)</p>	<p>Zip Code</p>

ST PAUL	MN	55101 -
Telephone Number (include area code) 6512901548	E-Mail Address (if available) RHORNBERGER@MPR.ORG	

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 PERMIT (U.S. CODE, TITLE 47, SECTION 312(a)(1)), AND/OR FORFEITURE (U.S. CODE, TITLE 47, SECTION 503).

Section III - Engineering			
TECHNICAL SPECIFICATIONS			
Ensure that the specifications below are accurate. Contradicting data found elsewhere in this application will be disregarded. All items must be completed. The response "on file" is not acceptable.			
TECH BOX			
1.	Channel: 211		
2.	a. Effective Radiated Power:	6 kW(H) 6 kW(V)	
	b. Maximum Effective Radiated Power: (Beam-Tilt Antenna ONLY) <input checked="" type="checkbox"/> Not Applicable	kW(H) kW(V)	
3.	Transmitter Power Output: 5 kW		
4.	Antenna Data		
	Manufacturer SHI	Model 6810-2R	Number of Sections 2
			Spacing Between Sections (wavelength) 1
NOTE: In addition to the information called for in this section, an explanatory exhibit providing full particulars must be submitted for each question for which a "No" response is provided.			
CERTIFICATION			
All applicants must complete this section.			
5.	Main Studio Location. The main studio location complies with 47 C.F.R. Section 73.1125.	<input type="radio"/> Yes <input type="radio"/> No	See Explanation in [Exhibit 6]
6.	Transmitter Power Output. The operating transmitter power output produces the authorized effective radiated power.	<input checked="" type="radio"/> Yes <input type="radio"/> No	See Explanation in [Exhibit 7]
APPLICATIONS FILED TO COVER A CONSTRUCTION PERMIT.			
Only applicants filing this application to cover a construction permit must complete the following section.			
NOTE: In addition to the information called for in this section, an explanatory exhibit providing full particulars must be submitted for each question for which a "No" response is provided.			
7.	Constructed Facility . The facility was constructed as authorized in the underlying construction permit or complies with 47 C.F.R. Section 73.1690.	<input checked="" type="radio"/> Yes <input type="radio"/> No	See Explanation in [Exhibit 8]
8.	Special Operating Conditions. The facility was constructed in compliance with all special operating conditions, terms, and obligations described in the construction permit.	<input checked="" type="radio"/> Yes <input type="radio"/> No	See Explanation in [Exhibit 9]

<p>An exhibit may be required. Review the underlying construction permit.</p>	<p>[Exhibit 10]</p>
<p>APPLICATIONS FILED PURSUANT TO 47 C.F.R. SECTIONS 73.1675(c) or 73.1690(c). Only applicants filing this application pursuant to 47 C.F.R. Sections 73.1675(c) or 73.1690(c) must complete the following section.</p>	
<p>9. Changing transmitter power output. Is this application being filed to authorize a change in transmitter power output caused by the replacement of omnidirectional antenna with another omnidirectional antenna or an alteration of the transmission line system? See 47 C.F.R. Sections 73.1690(c)(1) and (c)(10).</p>	<p><input type="radio"/> Yes <input checked="" type="radio"/> No</p>
<p>10. Increasing effective radiated power. Is this application being filed to authorize an increase in ERP for a station operating in the nonreserved band (Channels 221-300)? See 47 C.F.R. Sections 73.1690(c)(4), (c)(5) and (c)(7). If "Yes" to the above, the applicant certifies the following:</p>	<p><input type="radio"/> Yes <input checked="" type="radio"/> No</p>
<p>a. Spacing Requirements. The increase in ERP was authorized pursuant to MM Docket 88-375 (Class A stations) OR the facility complies with the spacing requirements of 47 C.F.R. Section 73.207.</p>	<p><input type="radio"/> Yes <input type="radio"/> No See Explanation in [Exhibit 11]</p>
<p>b. International Coordination. The transmitter site is greater than 320 km from the Canadian or Mexican borders OR coordination for the station's international class is complete.</p>	<p><input type="radio"/> Yes <input type="radio"/> No See Explanation in [Exhibit 12]</p>
<p>c. Interference. The requirements of 47 C.F.R. Section 73.1030 regarding notification to radio astronomy installations, radio receiving installations and FCC monitoring stations have either been satisfied OR are not applicable.</p>	<p><input type="radio"/> Yes <input type="radio"/> No See Explanation in [Exhibit 13]</p>
<p>Exhibit required. If the proposed facility must be notified to the entities set forth in 47 C.F.R. Section 73.1030, the applicant must provide a copy of the written approval for the ERP increase from the affected entity.</p>	<p>[Exhibit 14]</p>
<p>d. Multiple Ownership Showing. The increase in ERP will not require the consideration of a multiple ownership showing pursuant to 47 C.F.R. Section 73.3555.</p>	<p><input type="radio"/> Yes <input type="radio"/> No See Explanation in [Exhibit 15]</p>
<p>e. Environmental Protection Act. The proposed facility is excluded from environmental processing under 47 C.F.R. Section 1.1306 (i.e., the facility will not have a significant environmental impact and complies with the maximum permissible radiofrequency electromagnetic exposure limits for controlled and uncontrolled environments). Unless the applicant can determine compliance through the use of the RF worksheets in Appendix A, an Exhibit is required.</p>	<p><input type="radio"/> Yes <input type="radio"/> No See Explanation in [Exhibit 16]</p>
<p>By checking "Yes" above, the applicant also certifies that it, in coordination with other users of the site, will reduce power or cease operation as necessary to protect persons having access to the site, tower or antenna from radiofrequency electromagnetic exposure in excess of FCC guidelines.</p>	
<p>11. Increasing vertically polarized effective radiated power. Is this application being filed pursuant to 47 C.F.R. Section 73.1690(c)(4) to authorize an increase in the vertically polarized ERP for a station operating in the reserved band (Channels 200-220)? If "Yes" to the above, the applicant certifies the following:</p>	<p><input type="radio"/> Yes <input checked="" type="radio"/> No</p>
<p>a. TV Channel 6 Protection Requirements. The facility complies with the spacing requirements of 47 C.F.R. Section 73.525(a)(1).</p>	<p><input type="radio"/> Yes <input type="radio"/> No See Explanation in [Exhibit 17]</p>

	<p>b. Environmental Protection Act. The proposed facility is excluded from environmental processing under 47 C.F.R. Section 1.1 306 (i.e., the facility will not have a significant environmental impact and complies with the maximum permissible radiofrequency electromagnetic exposure limits for controlled and uncontrolled environments). Unless the applicant can determine compliance through the use of the RF worksheets in Appendix A, an Exhibit is required.</p>	<p><input type="radio"/> Yes <input type="radio"/> No</p> <p>See Explanation in [Exhibit 18]</p>
	<p>By checking "Yes" above, the applicant also certifies that it, in coordination with other users of the site, will reduce power or cease operation as necessary to protect persons having access to the site, tower or antenna from radiofrequency electromagnetic exposure in excess of FCC guidelines.</p>	
<p>12.</p>	<p>Decreasing effective radiated power (non-reserved channel). Is this application being filed pursuant to 47 C.F.R. Section 73.1690(c)(8) to authorize a decrease in the ERP for a station operating in the nonreserved band (Channels 221-300)?</p> <p>If "Yes" to the above, the applicant certifies the following:</p>	<p><input type="radio"/> Yes <input checked="" type="radio"/> No</p>
	<p>a. Community Coverage . The proposed facility complies with the community coverage requirements of 47 C.F.R. Section 73.315 where the distance to the 3.16 mV/m contour is predicted using the standard prediction method in 47 C.F.R. Section 73.313.</p>	<p><input type="radio"/> Yes <input type="radio"/> No</p> <p>See Explanation in [Exhibit 19]</p>
	<p>b. Auxiliary Facilities. The authorized or pending auxiliary facilities for this station comply with 47 C.F.R. Section 73.1675(a).</p>	<p><input type="radio"/> Yes <input type="radio"/> No</p> <p>See Explanation in [Exhibit 20]</p>
	<p>c. Multiple Ownership Showing. The decrease in ERP is not requested or required to establish compliance with 47 C.F.R. Section 73.3555.</p>	<p><input type="radio"/> Yes <input type="radio"/> No</p> <p>See Explanation in [Exhibit 21]</p>
<p>13.</p>	<p>Decreasing effective radiated power (reserved channel). Is this application being filed pursuant to 47 C.F.R. Section 73.1690(c)(8) to authorize a decrease in the ERP for a station operating in the reserved band (Channels 200-220)?</p> <p>If "Yes" to the above, the applicant certifies the following:</p>	<p><input type="radio"/> Yes <input checked="" type="radio"/> No</p>
	<p>a. Community Coverage . The proposed facility complies with the community coverage requirements of 47 C.F.R. Section 73.1690(c)(8)(i) where the distance to the 1 mV/m contour is predicted using the standard prediction method in 47 C.F.R. Section 73.313.</p>	<p><input type="radio"/> Yes <input type="radio"/> No</p> <p>See Explanation in [Exhibit 22]</p>
	<p>b. Auxiliary Facilities. The authorized or pending auxiliary facilities for this station comply with 47 C.F.R. Section 73.1675(a).</p>	<p><input type="radio"/> Yes <input type="radio"/> No</p> <p>See Explanation in [Exhibit 23]</p>
<p>14.</p>	<p>Replacing a directional antenna. Is this application being filed pursuant to 47 C.F.R. Section 73.1690(c)(2) to replace a directional antenna with another directional antenna?</p> <p>If "Yes" to the above, the applicant certifies the following:</p>	<p><input type="radio"/> Yes <input checked="" type="radio"/> No</p>
	<p>a. Measurement of Directional Antenna. The composite measured pattern and measurement procedures comply with 47 C.F.R. Section 73.1690(c)(2). Exhibit required.</p>	<p><input type="radio"/> Yes <input type="radio"/> No</p> <p>See Explanation in [Exhibit 24]</p> <p>[Exhibit 25]</p>

	<p>b. Installation of Directional Antenna. The installation of the directional antenna complies with 47 C.F.R. Section 73.1690(c)(2). Exhibit required.</p>	<p><input type="radio"/> Yes <input type="radio"/> No See Explanation in [Exhibit 26] [Exhibit 27]</p>
15.	<p>Deleting contour protection status. Is this application being filed pursuant to 47 C.F.R. Section 73.1690(c)(6) to delete contour protection status (47 C.F.R. Section 73.215) for a station operating in the nonreserved band (Channels 221-300)?</p>	<p><input type="radio"/> Yes <input checked="" type="radio"/> No</p>
	<p>If "Yes" to the above, the applicant certifies that the facility complies with the spacing requirements of 47 C.F.R. Section 73.207.</p>	<p><input type="radio"/> Yes <input type="radio"/> No See Explanation in [Exhibit 28]</p>
16.	<p>Use a formerly licensed main facility as an auxiliary facility. Is this application being filed pursuant to 47 C.F.R. Section 73.1675(c)(1) to request authorization to use a formerly licensed main facility as an auxiliary facility and/or change the ERP of the proposed auxiliary facility?</p> <p>If "Yes" to the above, the applicant certifies the following:</p>	<p><input type="radio"/> Yes <input checked="" type="radio"/> No</p>
	<p>a. Auxiliary antenna service area. The proposed auxiliary facility complies with 47 C.F.R. Section 73.1675(a).</p>	<p><input type="radio"/> Yes <input type="radio"/> No See Explanation in [Exhibit 29]</p>
	<p>b. Environmental Protection Act. The proposed facility is excluded from environmental processing under 47 C.F.R. Section 1.1 306 (i.e., the facility will not have a significant radiofrequency electromagnetic exposure limits for controlled and uncontrolled environments). Unless the applicant can determine compliance through the use of the RF worksheets in Appendix A, an Exhibit is required.</p>	<p><input type="radio"/> Yes <input type="radio"/> No See Explanation in [Exhibit 30]</p>
	<p>By checking "Yes" above, the applicant also certifies that it, in coordination with other users of the site, will reduce power or cease operation as necessary to protect persons having access to the site, tower or antenna from radiofrequency electromagnetic exposure in excess of FCC guidelines.</p>	
17.	<p>Change the license status. Is this application being filed pursuant to 47 C.F.R. Section 73.1690(c)(9) to change the license status from commercial to noncommercial or from noncommercial to commercial?</p>	<p><input type="radio"/> Yes <input checked="" type="radio"/> No</p>
	<p>If "Yes" to the above, submit an exhibit providing full particulars. For applications changing license status from commercial to noncommercial, include Section II of FCC Form 340 as an exhibit to this application.</p>	<p>[Exhibit 31]</p>
<p>PREPARERS CERIFICATION ON PAGE 3 MUST BE COMPLETED AND SIGNED.</p>		

Exhibits

Exhibit 6

Description: KNSE LICENSE APP / EXHIBIT 6

A WAIVER OF 47 CFR SECTION 73.1125 WAS GRANTED AS SPECIAL OPERATING CONDITION #5 OF CONSTRUCTION PERMIT FILE NO. BPED-19980603MB.

Attachment 6

Attachment 7

Attachment 8

Attachment 9

Exhibit 10

Description: KNSE / EXHIBIT 10

COMPLIANCE WITH SPECIAL CONDITIONS OF CONSTRUCTION PERMIT BPED-19980603MB

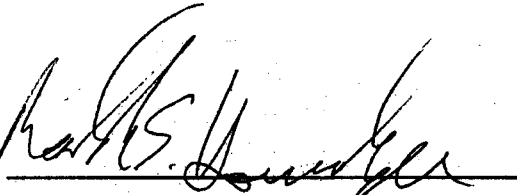
Attachment 10

Description
KNSE Exhibit 10 #1 / Engineering Affidavit
KNSE Exhibit 10 #2 / Surveyor's Affidavit
KNSE Exhibit 10 #3 / Proof of Performance

Affidavit

I hereby certify under penalty of perjury, the following:

1. I am the duly qualified Senior Design Engineer of Minnesota Public Radio, a position I have held for 2 years, and have been employed as an engineer by Minnesota Public Radio since 1980.
2. I have approximately 40 years experience in the area of radio engineering, and the work I have done with the Federal Communications Commission is a matter of record.
3. I hold a General Radiotelephone Operator License, license number PG-3-11163, issued January 2, 1985 by the Federal Communications Commission.
4. In my capacity as Senior Design Engineer of Minnesota Public Radio, I oversaw the installation of the antenna for station KNSE, authorized by Construction Permit BPED-19980603MB.
5. I hereby certify that said installation was installed pursuant to the manufacturer's instructions.


Ralph E. Hornberger

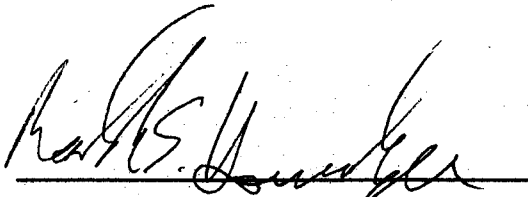
17 Dec 03

Date

Affidavit

I hereby certify under penalty of perjury, the following:

1. I am the duly qualified Senior Design Engineer of Minnesota Public Radio, a position I have held for 2 years, and have been employed as an engineer by Minnesota Public Radio since 1980.
2. I have approximately 40 years experience in the area of radio engineering, and the work I have done with the Federal Communications Commission is a matter of record.
3. I hold a General Radiotelephone Operator License, license number PG-3-11163, issued January 2, 1985 by the Federal Communications Commission.
4. In my capacity as Senior Design Engineer of Minnesota Public Radio, I oversaw the installation of the antenna for station KNSE, authorized by Construction Permit BPED-19980603MB.
5. I hereby certify that said installation was installed pursuant to the manufacturer's instructions.


Ralph E. Hornberger

17 Dec 03
Date



Established 1945

JHS

JONES, HAUGH & SMITH INC.
CONSULTING ENGINEERS
CIVIL ENGINEERS & LAND SURVEYORS

515 South Washington
ALBERT LEA, MINNESOTA 56007
Telephone: 507/373-4876
Fax: 507/373-1839

December 22, 2003

JOHN H. SCHULTE IV
Reg. Land Surveyor

STEVEN J. THOMPSON
Reg. Land Surveyor

BRIAN J. JOHNSON
Reg. Civil Engineer

ARTHUR W. SMITH
Reg. Civil Engineer

C.V. JONES
1901 - 1990

HAROLD H. HAUGH
1925 - 2001

Minnesota Public Radio
Attn: Randy
45 East 7th Street
St. Paul, MN 55101

Dear Randy:

Enclosed is the requested Affidavit for the direction of the two antennas on your tower located in the NW $\frac{1}{4}$ Section 17-T102N-R19W, Freeborn County.

If there are any questions, please let us know.

Yours very truly,

JONES, HAUGH & SMITH INC
CONSULTING ENGINEERS



John H. Schulte IV, RLS

Enclosure

AFFIDAVIT

I hereby certify under penalty of perjury, the following:

1. I am a Registered Surveyor in the State of Minnesota.
2. On December 18, 2003 we established a point 587 feet, north of the northwest leg of the radio tower located in the southwest corner of the NW¼ Section 17-T102N-R19W, at an astronomic azimuth of 0°00'00". To establish this point we used LEICA GPS 500 Equipment and Freeborn County Coordinate System 1996 HARN Adjustment. The Theta angle from grid to astronomic at the tower leg is 0°33'13".
3. I do hereby certify that each of the two sections of the Minnesota Public Radio, KNSE directional antenna are oriented to a true azimuth of 00°00' if pointed using the above established point.



John H. Schulte IV
Minnesota Registered Land Surveyor
No. 13807

Dated: December 22, 2003

S.O. 23178

Report of Test 6810-2R-DA

for

MINNESOTA PUBLIC RADIO

KNSE 90.1 MHz AUSTIN, MN

OBJECTIVE:

The objective of this test was to demonstrate the directional characteristics of a 6810-2R-DA to meet the needs of KNSE and to comply with the requirements of the FCC construction permit, file number BPED-19980603MB.

RESULTS:

The measured azimuth pattern for the 6810-2R-DA is shown in Figure 1. Figure 1A shows the Tabulation of the Horizontal Polarization. Figure 1B shows the Tabulation of the Vertical Polarization. The calculated elevation pattern of the antenna is shown in Figure 3. Construction permit file number BPED-19980603MB indicates that the Horizontal radiation component shall not exceed 6.0 kW at any azimuth and is restricted to the following values at the azimuths specified:

190 Degrees T: 1.5 kW

From Figure 1, the maximum radiation of the Horizontal component occurs at 313 Degrees T to 333 Degrees T. At the restricted azimuth of 190 Degrees T the Horizontal component is 10.6 dB down from the maximum of 6.0 kW, or 0.52 kW.

The R.M.S. of the Horizontal component is 0.745. The total Horizontal power gain is 1.847. The R.M.S. of the Vertical component is 0.720. The total Vertical power gain is 1.612. See Figure 4 for calculations. The R.M.S. of the FCC composite pattern is 0.870. Therefore this Pattern complies with the FCC requirement of 73.316(c)(2)(ix)(A).

METHOD OF DIRECTIONALIZATION:

One bay of the 6810-2R-DA was mounted on a tower of exact scale to a 42" face tower at the KNSE site. The spacing of the antenna to the tower was varied to achieve the vertical pattern shown in Figure 1. A horizontal parasitic element was placed directly under the bay. The position of this horizontal parasitic element was changed until the horizontal pattern shown in Figure 1 was achieved. See Figure 2 for mechanical details.

METHOD OF MEASUREMENT:

As allowed by the construction permit, file number BPED-19980603MB, a single level of the 6810-2R-DA was set up on the Howell Laboratories scale model antenna pattern measuring range. A scale of 4.5:1 was used.

SUPERVISION:

Mr. Surette was graduated from Lowell Technological Institute, Lowell, Massachusetts in 1973 with the degree of Bachelor of Science in Electrical Engineering. He has been directly involved with design and development of broadcast antennas, filter systems and RF transmission components since 1974, as an RF Engineer for six years with the original Shively Labs in Raymond, ME and for a short period of time with Dielectric Communications. He is currently an Associate Member of the AFCCE and a Senior Member of IEEE. He has authored a chapter on filters and combining systems for the latest edition of the CRC Electronics Handbook and for the 9th Edition of the NAB Handbook.

EQUIPMENT:

The scale model pattern range consists of a wooden rotating pedestal equipped with a position indicator. The scale model bay is placed on the top of this pedestal and is used in the transmission mode at approximately 20 feet above ground level. The receiving corner reflector is spaced 50 feet away from the rotating pedestal at the same level above ground as the transmitting model. The transmitting and receiving signals are carried to a control building by means of RG-9/U double shielded coax cable.

The control building is equipped with:

Hewlett Packard Model 8753 Network Analyzer

PC Based Controller

Hewlett Packard 7550A Graphics Plotter

The test equipment is calibrated to ANSI/NCSL Z540-1-1994.

TEST PROCEDURES:

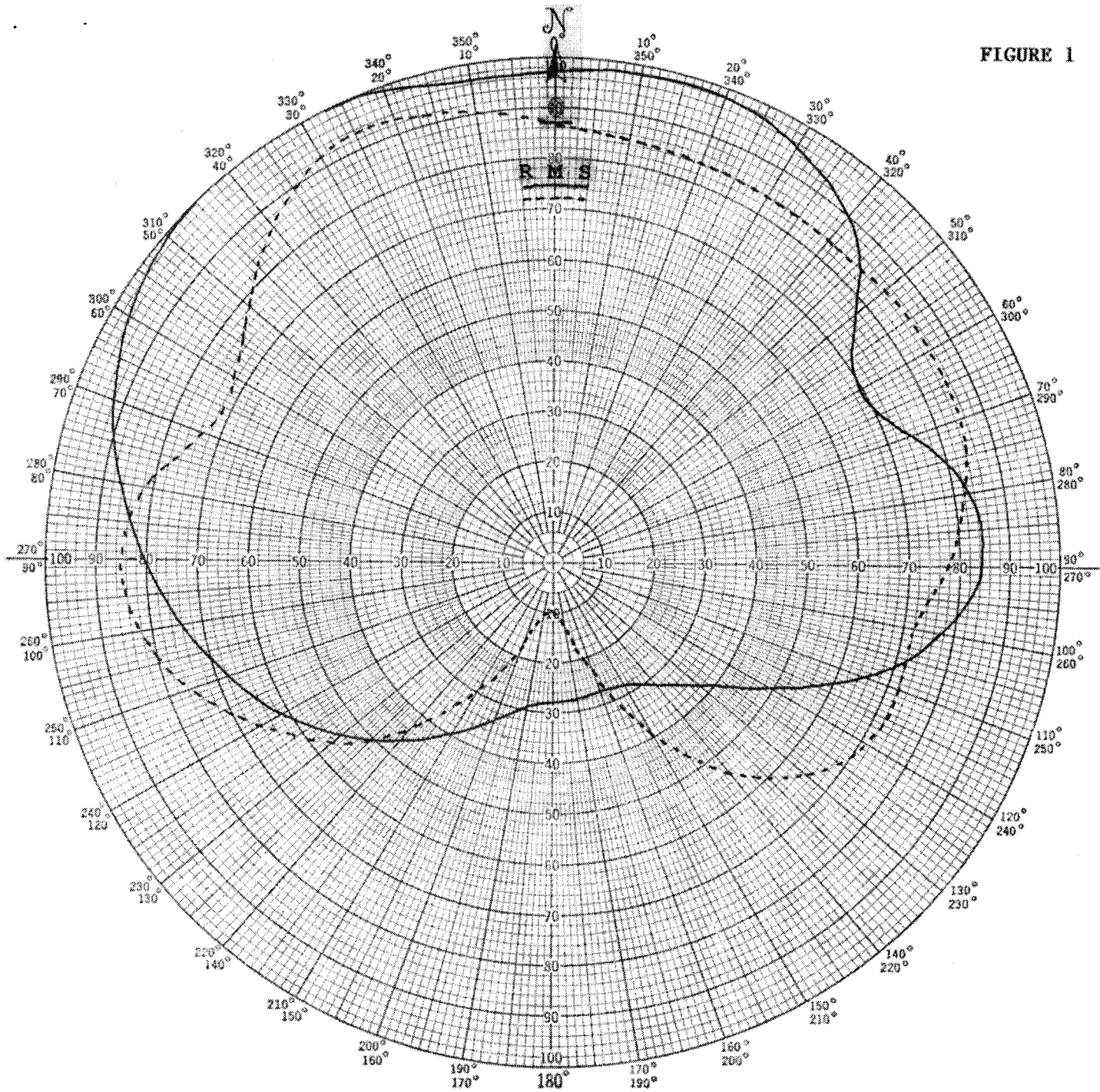
The corner reflector is mounted so that the horizontal and vertical azimuth patterns are measured independently by rotating the corner reflector by 90 degrees. The network analyzer was set to 405.45 MHz. Calibrated pads are used to check the linearity of the measuring system. For example, 6 dB padding yields a scale reading of 50 from an unpadding reading of 100 in voltage. From the recorded patterns, the R.M.S. values are calculated and recorded as shown in Figure 1.

Respectfully submitted by:



Robert A. Surette
Manager of RF Engineering
S/O 23178
November 11, 2003

FIGURE 1



Shively Labs

PROJECT NAME KNSE AUSTIN, MN
 PROJECT NUMBER 23178 DATE 10/28/03
 MODEL () FULL SCALE () FREQUENCY 405.45/90.1 MHz
 POLARIZATION HORIZ (——); VERT (----)
 CURVE PLOTTED IN: VOLTAGE () POWER () DB ()
 OBSERVER RAS

ANTENNA TYPE 6810-2R-DA
 PATTERN TYPE DIRECTIONAL AZIMUTH
 REMARKS: SEE FIGURE 2 FOR MECHANICAL
DETAILS

Figure 1A

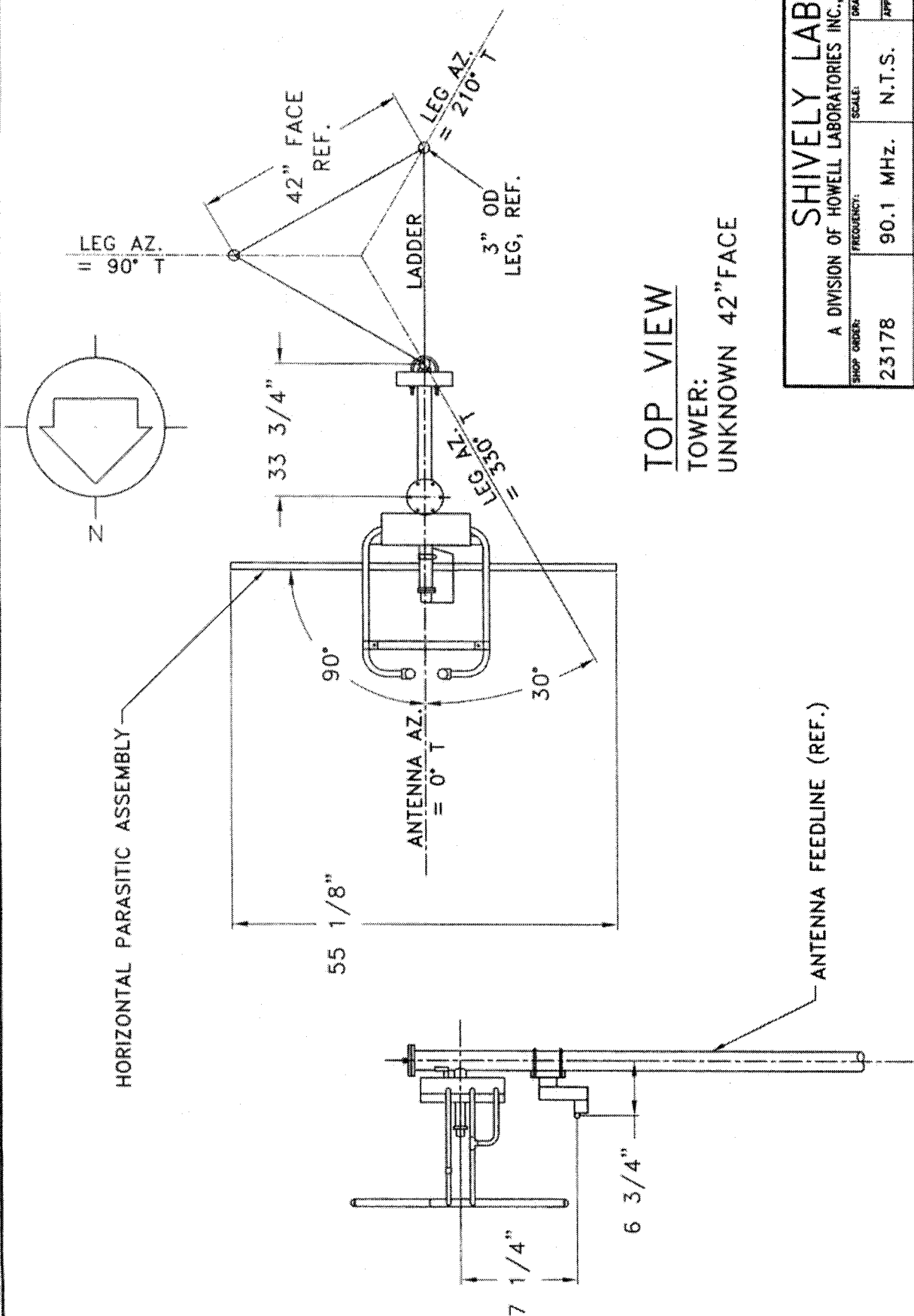
S/O 23178
 TABULATION OF HORIZONTAL POLARIZATION
 KNSE AUSTIN, MN

DEGREE	RELATIVE FIELD	DEGREE	RELATIVE FIELD
0	0.970	180	0.280
10	0.980	190	0.295
20	0.980	200	0.335
30	0.955	210	0.395
40	0.900	220	0.465
45	0.850	225	0.510
50	0.775	230	0.540
60	0.695	240	0.610
70	0.750	250	0.675
80	0.830	260	0.740
90	0.840	270	0.800
100	0.775	280	0.865
110	0.650	290	0.920
120	0.490	300	0.965
130	0.380	310	0.990
135	0.340	315	1.000
140	0.315	320	1.000
150	0.280	330	1.000
160	0.275	340	0.990
170	0.280	350	0.970

Figure 1B

S/O 23178
TABULATION OF VERTICAL POLARIZATION
KNSE AUSTIN, MN

DEGREE	RELATIVE FIELD	DEGREE	RELATIVE FIELD
0	0.865	180	0.100
10	0.850	190	0.105
20	0.840	200	0.180
30	0.840	210	0.300
40	0.840	220	0.430
45	0.840	225	0.515
50	0.850	230	0.570
60	0.850	240	0.665
70	0.850	250	0.750
80	0.820	260	0.820
90	0.780	270	0.850
100	0.720	280	0.820
110	0.720	290	0.735
120	0.710	300	0.725
130	0.650	310	0.785
135	0.600	315	0.825
140	0.545	320	0.860
150	0.400	330	0.920
160	0.230	340	0.930
170	0.110	350	0.900



TOP VIEW

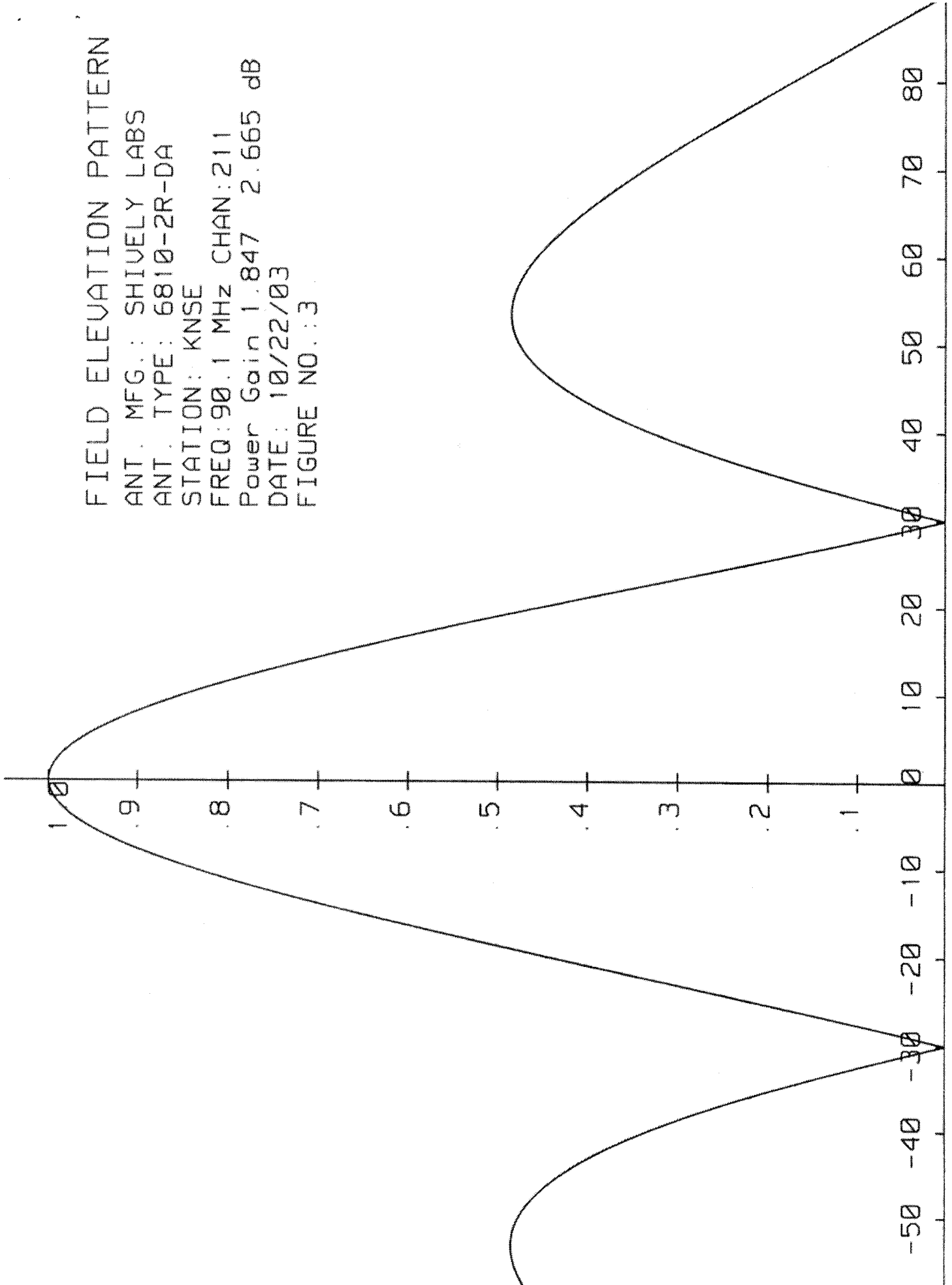
TOWER:
UNKNOWN 42"FACE

SIDE VIEW

SHIVELY LABS			
A DIVISION OF HOWELL LABORATORIES INC., BRIDGTON, MAINE			
SHOP ORDER:	FREQUENCY:	SCALE:	DRAWN BY:
23178	90.1 MHZ.	N.T.S.	ASP
TITLE:			APPROVED BY:
MODEL-6810-2R-DIRECTIONAL ANTENNA			
DATE:			
11/6/03			

FIGURE 2

FIELD ELEVATION PATTERN
ANT. MFG.: SHIVELY LABS
ANT. TYPE: 6810-2R-DA
STATION: KNSE
FREQ: 90.1 MHz CHAN: 211
Power Gain 1.847 2.665 dB
DATE: 10/22/03
FIGURE NO.: 3



S.O. 23178

VALIDATION OF GAIN CALCULATION

KNSE AUSTIN, MN

MODEL 6810-2R-DA

Elevation Gain of 6810-2R-DA equals 0.99

The RMS values are calculated utilizing the data of a planimeter.

Horizontal RMS divided by Vertical RMS equals

$$0.745 \div 0.720 = 1.035$$

Elevation Gain of Horizontal Component equals

$$0.99 \times 1.035 = 1.025$$

Elevation Gain of Vertical Component equals

$$0.99 \times 0.966 = 0.956$$

Horizontal Azimuth Gain equals $1/(\text{RMS})^2$

$$1/(0.745)^2 = 1.802$$

Vertical Azimuth Gain equals $1/(\text{RMS} \div \text{Max Vert})^2$

$$1/(0.720 \div 0.935)^2 = 1.686$$

* Total Horizontal Gain is Elevation Gain times Azimuth Gain

$$1.025 \times 1.802 = 1.847$$

* Total Vertical Gain is Elevation Gain times Azimuth Gain

$$0.956 \times 1.686 = 1.612$$

ERP divided by Horizontal Gain equals Antenna Input Power

$$6.0 \text{ kW} \div 1.847 = 3.249 \text{ kW}$$

Antenna Input Power times Vertical Gain equals Vertical ERP

$$3.249 \times 1.612 = 5.24 \text{ kW}$$

Maximum Value of the Vertical Component squared times the Maximum ERP equals the Vertical ERP

$$(0.935)^2 \times 6.0 \text{ kW} = 5.24 \text{ kW}$$

NOTE: Calculating the ERP of the Vertical Component by two methods validates the total antenna gain calculations