Shively Labs
a division of Howell Laboratories,Inc.

P. O. Box 389 Harrison Rd.,
Bridgton, Maine 04009 USA
(207) 647-3327
888-SHIVELY
Fax: (207) 647-8273
E-mail: sales@shively.com
Web site: www.shively.com

S.O. 22852

Report of Test 6810-2-SS-DA

for

LAKE RADIO, INC.

WLKQ-FM 102.3 MHZ BUFORD, GA

OBJECTIVE:

The objective of this test was to demonstrate the directional characteristics of a 6810-2-SS-DA to meet the needs WLKQ-FM and to comply with the requirements of the FCC construction permit, file number BPH-20000303ACG.

RESULTS:

The measured azimuth pattern for the 6810-2-SS-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 BPH-20000303ACG indicates that the Horizontal radiation component shall not exceed 4.2 kW at any azimuth and is restricted to the following values at the azimuths specified:

100 Degrees T: 1.4 kW

110 Degrees T: 1.4 kW

From Figure 1, the maximum radiation of the Horizontal component occurs at 269 Degrees T to 305 Degrees T. At the restricted azimuth of 100 Degrees T the Horizontal component is 5.76 dB down from the maximum of 4.2 kW, or 1.1 kW. At the restricted azimuth of 110 Degrees T the Horizontal component is 5.68 dB down from the maximum of 4.2 kW, or 1.2 kW.

EXHIBIT B1

The R.M.S. of the Horizontal component is 0.78. The total Horizontal power gain is 1.180. The R.M.S. of the Vertical component is 0.76. The total Vertical power gain is 1.169. See Figure 4 for calculations. The measured composite pattern has an R.M.S. value of 0.814. The R.M.S. of the FCC composite pattern is 0.938. Therefore this Pattern complies with the FCC requirement of 73.316(c)(2)(ix)(A).

METHOD OF DIRECTIONALIZATION:

One bay of the 6810-2-SS-DA was mounted on a tower of exact scale to a Pi-Rod 24" x 300' tower. The spacing of the antenna to the tower was varied and vertical parasitic elements were attached to the interbay feedline 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 BPH-20000303ACG, a single level of the 6810-2-SS-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.

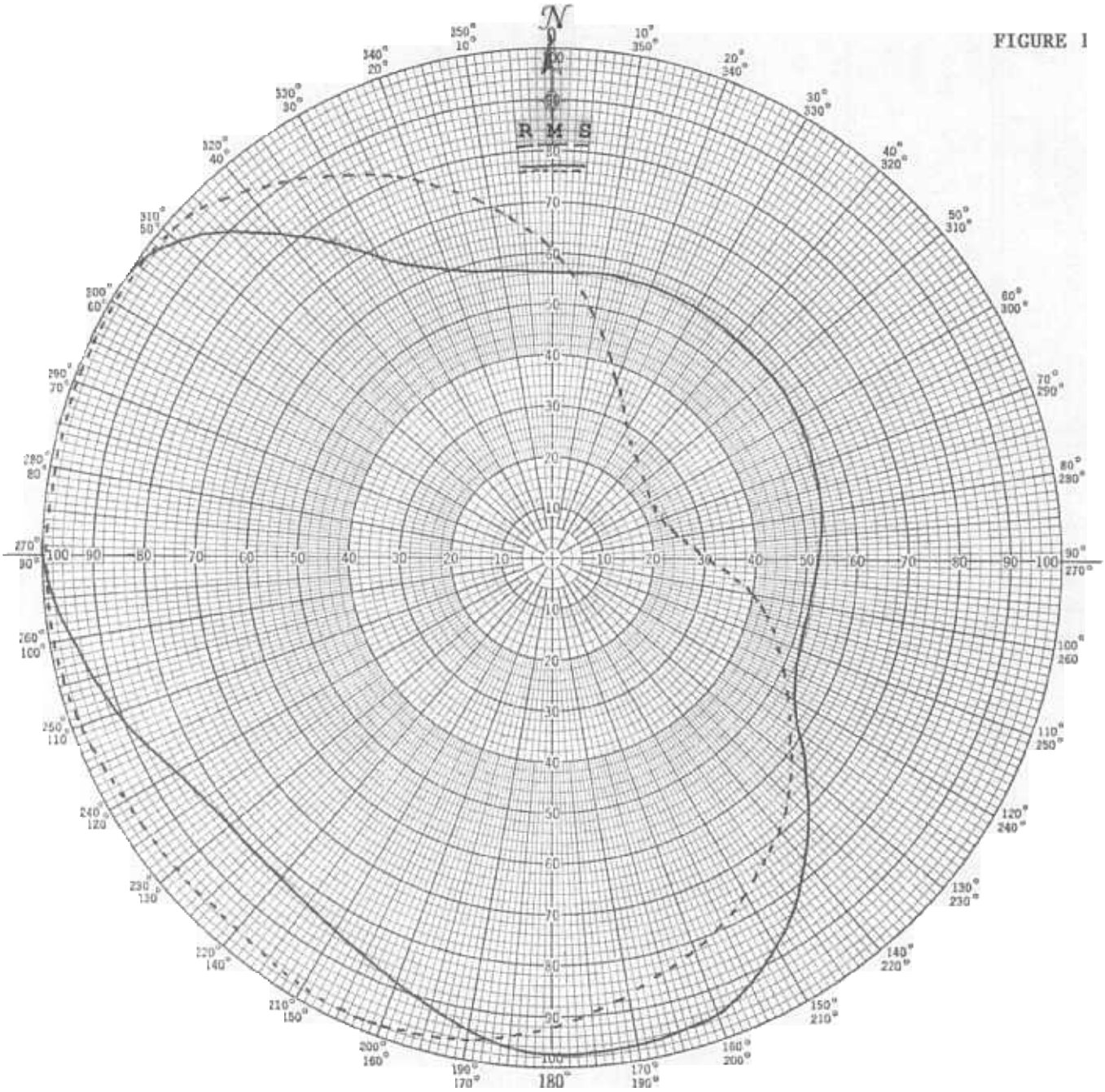
TEST PROCEDURES:

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 460.35 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 unpadded 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 22852
March 18, 2003

FIGURE 1



Shively Labs

PROJECT NAME WLKQ-FM BUFORD, GA

PROJECT NUMBER 22852 DATE 2/19/03

MODEL (X) FULL SCALE ( ) FREQUENCY 460.35/102.3 MHz

POLARIZATION HORIZ (——); VERT (- - - -)

CURVE PLOTTED IN: VOLTAGE (X) POWER( ) DB( )

OBSERVER RAS

ANTENNA TYPE 6810-2-SS-DA

PATTERN TYPE DIRECTIONAL AZIMUTH

REMARKS SEE FIGURE 2 FOR MECHANICAL DETAILS

Figure 1A

S/O 22852
TABULATION OF HORIZONTAL POLARIZATION
WLKQ-FM BUFORD, GA

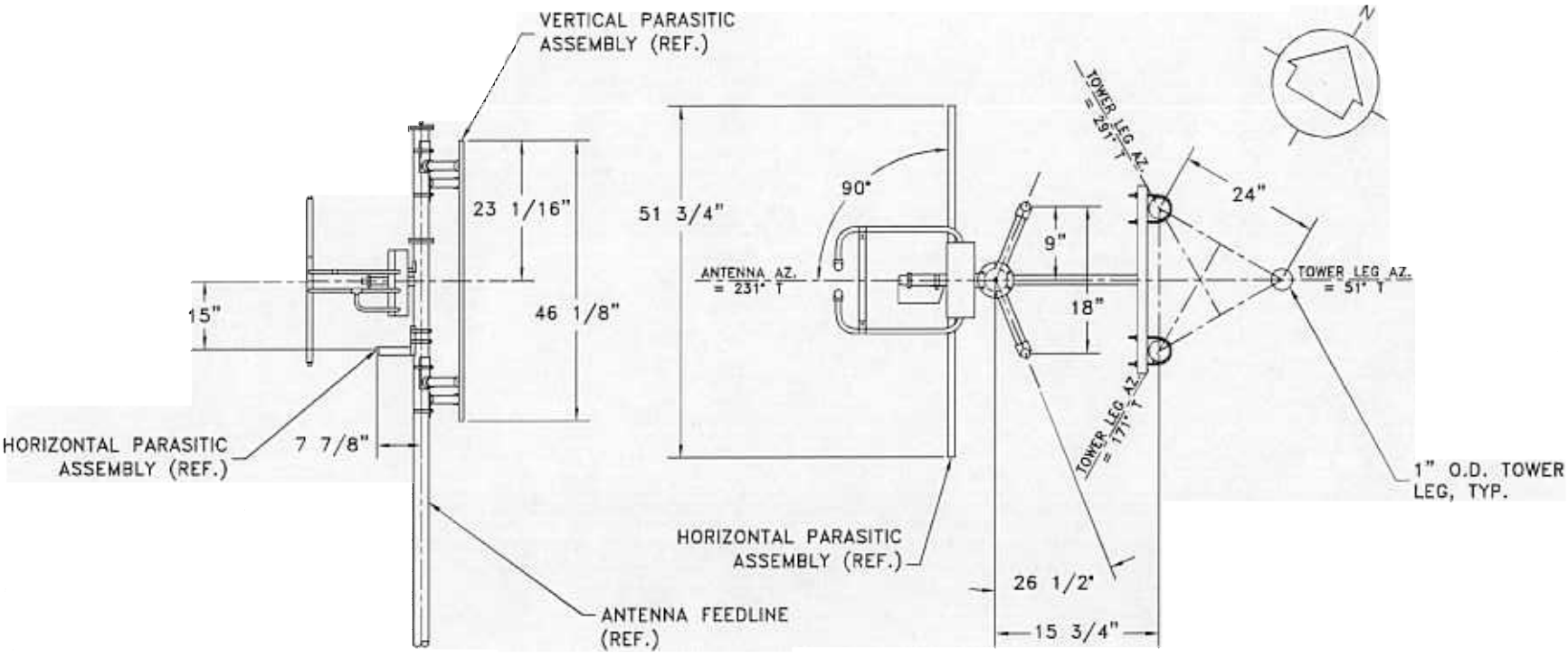
DEGREE	RELATIVE FIELD	DEGREE	RELATIVE FIELD
0	0.560	180	0.980
10	0.570	190	0.940
20	0.570	200	0.890
30	0.565	210	0.850
40	0.560	220	0.825
45	0.560	225	0.820
50	0.560	230	0.820
60	0.560	240	0.850
70	0.545	250	0.910
80	0.540	260	0.955
90	0.525	270	1.000
100	0.515	280	1.000
110	0.520	290	1.000
120	0.550	300	1.000
130	0.650	310	0.960
135	0.710	315	0.900
140	0.770	320	0.825
150	0.875	330	0.680
160	0.950	340	0.600
170	0.970	350	0.575

Figure 1B

S/O 22852
TABULATION OF VERTICAL POLARIZATION
WLKQ-FM BUFORD, GA

DEGREE	RELATIVE FIELD	DEGREE	RELATIVE FIELD
0	0.610	180	0.925
10	0.485	190	0.960
20	0.370	200	0.980
30	0.295	210	0.975
40	0.260	220	0.960
45	0.245	225	0.955
50	0.240	230	0.960
60	0.225	240	0.965
70	0.230	250	0.980
80	0.250	260	0.995
90	0.305	270	0.990
100	0.400	280	0.990
110	0.470	290	0.995
120	0.535	300	0.990
130	0.615	310	0.985
135	0.655	315	0.970
140	0.695	320	0.935
150	0.760	330	0.865
160	0.815	340	0.790
170	0.865	350	0.700

TOP VIEW



SIDE VIEW

SHIVELY LABS A DIVISION OF HOWELL LABORATORIES INC.,BRIDGTON, MAINE			
SHOP ORDER: 22852	FREQUENCY: 102.3 MHz.	SCALE: N.T.S.	DRAWN BY: WS APPROVED BY:
TITLE: MODEL-6810-2-1/2SS-DIRECTIONAL ANTENNA			
DATE: 3/13/03	FIGURE 2		

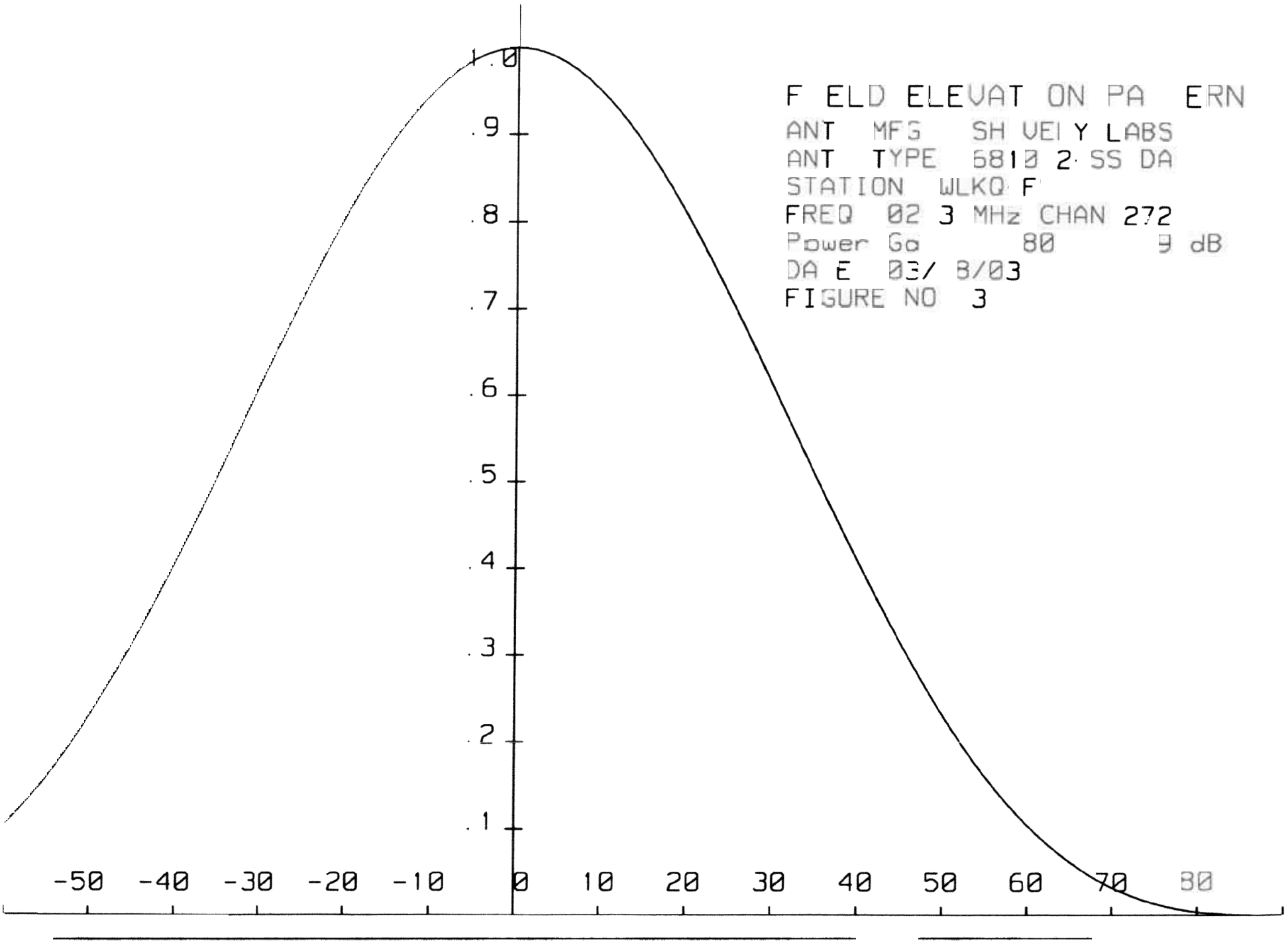

FIELD ELEVATION PATTERN
ANT MFG SHIVELY LABS
ANT TYPE 6810 2 SS DA
STATION WLKQ F
FREQ 92.3 MHz CHAN 272
Power Gain 80 9 dB
DATE 03/03/03
FIGURE NO 3
1.0
.9
.8
.7
.6
.5
.4
.3
.2
.1
-50 -40 -30 -20 -10 0 10 20 30 40 50 60 70 80

FIGURE 4

S.O. 22852

VALIDATION OF GAIN CALCULATION

WLKQ-FM BUFORD, GA

MODEL 6810-2-SS-DA

Elevation Gain of 6810-2-SS-DA equals 0.70

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

Horizontal RMS divided by Vertical RMS equals
$0.78 \div 0.76 = 1.026$

Elevation Gain of Horizontal Component equals
$0.70 \times 1.026 = 0.718$

Elevation Gain of Vertical Component equals
$0.70 \times 0.974 = 0.682$

Horizontal Azimuth Gain equals $1/(RMS)^2$
$1/(0.78)^2 = 1.644$

Vertical Azimuth Gain equals $1/(RMS \div Max\ Vert)^2$
$1/(0.76 \div 0.995)^2 = 1.714$

* **Total Horizontal Gain is Elevation Gain times Azimuth Gain**
  $0.718 \times 1.644 = 1.180$

* **Total Vertical Gain is Elevation Gain times Azimuth Gain**
  $0.682 \times 1.714 = 1.169$

ERP divided by Horizontal Gain equals Antenna Input Power
$4.2\ kW \div 1.180 = 3.559\ kW$

Antenna Input Power times Vertical Gain equals Vertical ERP
$3.559 \times 1.169 = 4.160\ kW$

Maximum Value of the Vertical Component squared times the Maximum ERP equals the Vertical ERP
$(0.995)^2 \times 4.2\ kW = 4.158\ kW$

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

D Squared Broadcast Technologies, Inc.
P.O. Box 6421
Athens, GA 30604

Directional Antenna Installation

WLKQ
Buford, GA

April 3, 2003

This statement certifies that I oversaw the assembly and installation of the directional antenna for WLKQ. The installation contractor, Continental Tower Service, followed the antenna manufacturer's installation instructions and drawings. All elements were positioned precisely, using factory provided alignment marks and numbering. The antenna azimuth was verified by a licensed land surveyor, as indicated in an attached exhibit.

Date: 4/3/03

Daniel L. Davis, CPBE

A. C. TEEMS NOTARY PUBLIC GEORGIA CLARKE COUNTY EXPIRES JULY 27, 2004
4/4/03

Voice: 706-543-3313 Fax: 706-546-6313 E-Mail: dsquared@negia.net

EXHIBIT B2

D Squared Broadcast Technologies, Inc.
P.O. Box 6421
Athens, GA 30604

Qualifications

Daniel L. Davis deposes and says:

That he prepared the attached exhibit and that all work contained in that exhibit is true of his knowledge and belief, and as to such statements made on belief, they are believed to be true.

That he currently holds a F.C.C. General Class Radiotelephone License and had held a FCC First Class Radiotelephone License for ten years prior to receiving the General Class License in 1985. He also holds Professional Broadcast Engineer certification through the Society of Broadcast Engineers, and has been a member of the SBE since 1983.

That he received the degree of Master of Education from the University of Georgia in 1978, and that his undergraduate program of study was strong in Mathematics and Physics.

That he has been involved in the technical aspects of broadcasting since 1975, and has performed design, installation, project management, troubleshooting, and maintenance of broadcast facilities, including compliance measurements in connection with this work.

Daniel L. Davis
FCC Lic. No. PG-6-14509
SBE CPBE No. 50651

Subscribed and sworn before me

This 4th day of April, 2003

Notary Public

My Commission Expires 7/27/04

SEAL:

Voice: 706-543-3313 Fax: 706-546-6313 E-Mail: dsquared@negia.net

THOMAS WOOD & ASSOCIATES
50 MAIN STREET, BUFORD, GA 30518
TELEPHONE (770) 945-3804

April 5, 2003

Mr. Bob Joseph
Lake Radio, Inc.
Buford, GA 30518

Dear Mr. Joseph:

I, Thomas Wood, Georgia Professional Land Surveyor, certify that I personally supervised the field work to align the antenna of WLKQ Radio on a true azimuth of 238°, and that work was performed to the current professional standards.

Respectfully,

Thomas Wood

Thomas Wood , PLS #1990

EXHIBIT B3