TECHNICAL EXHIBIT
APPLICATION FOR LICENSE
STATION KAYO-FM (FACILITY ID 33622)
ELMA, WASHINGTON
CH 257C 41 KW (MAX-DA) 620 M

Technical Statement

This Technical Statement was prepared on behalf of Radio Station KAYO-FM on Channel 257C assigned to Elma, Washington. The station has been constructed and program testing is hereby requested with submission of this application for license. The facility was constructed pursuant to its construction permit with the authorized facilities of 41 kilowatts (directional antenna) effective radiated power and an antenna height above average terrain of 620 meters on Channel 257C.[1]

Special operating conditions 1, 4, 5 and 6 of the construction permit are address in this exhibit. Conditions 2 and 3 are addressed elsewhere in this application for license.

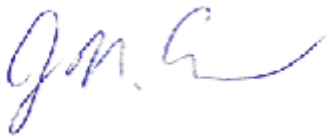
1. A complete antenna proof-of-performance prepared by Shively Labs is attached.

4. The pattern maximum is 41 kilowatts, while the pattern minima (at 0 degrees True) is 3.6 kilowatts (relative field of 0.295).

5. The permitee/licensee, in coordination with others, will reduce power when necessary.

[1] See KAYO-FM FCC Construction Permit File Number: BMPH-20040716AAA.

6. The antenna installed is the same as described in the application for construction permit and thus the same used in the FCC radiofrequency electromagnetic field exposure calculation (Shively, model 6810-10D-SS-DA).



Jonathan N. Edwards

du Treil, Lundin & Rackley, Inc.
201 Fletcher Avenue
Sarasota, Florida 34237
941.329.6000

July 22, 2004

TECHNICAL EXHIBIT
APPLICATION FOR LICENSE
STATION KAYO-FM (FACILITY ID 33622)
ELMA, WASHINGTON
CH 257C 41 KW (MAX-DA) 620 M

KAYO-FM RF Transmission System Specifications

Description	System
Transmitter Power Output (8.2 kW):	9.1 dBk
Transmission Line Loss (3" air) 145 feet:	0.2 dB
Shively 6810-10D-SS-DA (5.26 Power Gain):	7.2 dB
Effective Radiated Power (41 kW):	16.1 dBk

Shively Labs
a division of Howell Laboratories,Inc.

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S.O. 23321

Report of Test 6810-10D-SS-DA

for

SOUTH SOUND BROADCASTING, LLC

KAYO-FM 99.3 MHz ELMA, WA

OBJECTIVE:

The objective of this test was to demonstrate the directional characteristics of a 6810-10D-SS-DA to meet the needs of KAYO-FM and to comply with the requirements of the FCC construction permit, file number BPH-20021227ACD.

RESULTS:

The measured azimuth pattern for the 6810-10D-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-20021227ACD indicates that the Horizontal radiation component shall not exceed 41 kW at any azimuth and is restricted to the following values at the azimuths specified:

350 Degrees T: 6.659 kW
0 Degrees T: 4.198 kW
10 Degrees T: 6.659 kW

From Figure 1, the maximum radiation of the Horizontal component occurs at 068 Degrees T to 096 Degrees T and at 213 Degrees T to 246 Degrees T. At the restricted azimuth of 350 Degrees T the Horizontal component is 10.46 dB down from the maximum of 41 kW, or 3.69 kW. At the restricted azimuth of 0 Degrees T the Horizontal component is 10.60 dB down from the maximum of 41 kW, or 3.568 kW. At the restricted azimuth of 10 Degrees T the Horizontal component is 9.76 dB down from the maximum of 41 kW, or 4.33 kW.

The R.M.S. of the Horizontal component is 0.780. The total Horizontal power gain is 5.259. The R.M.S. of the Vertical component is 0.765. The total Vertical power gain is 5.151. See Figure 4 for calculations. The R.M.S. of the FCC composite pattern is 0.911. Therefore this Pattern complies with the FCC requirement of 73.316(c)(2)(ix)(A).

METHOD OF DIRECTIONALIZATION:

One bay of the 6810-10D-SS-DA was mounted on a tower of exact scale to the 28″ square tower at the KAYO-FM transmitter 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 BPH-20021227ACD, a single level of the 6810-10D-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.

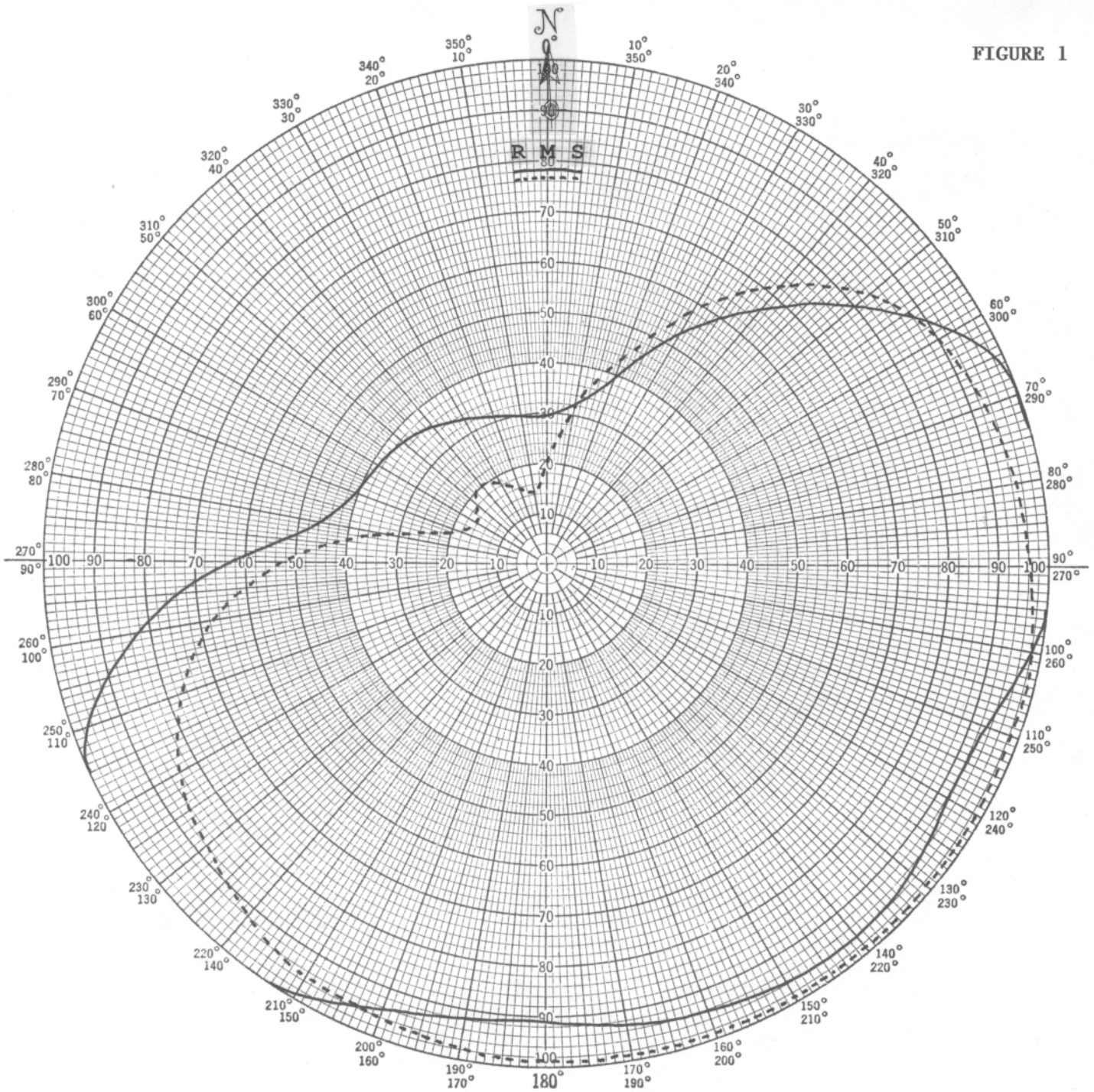
TEST PROCEDURES:

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 446.85 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 23321
February 2, 2004

FIGURE 1



Shively Labs

PROJECT NAME KAYO-FM ELMA, WA

PROJECT NUMBER 23321 DATE 2/6/04

MODEL (X) FULL SCALE ( ) FREQUENCY 446.85/99.3 MHz

POLARIZATION HORIZ (——); VERT (----)

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

OBSERVER RAS

ANTENNA TYPE 6810-10D-SS-DA

PATTERN TYPE DIRECTIONAL AZIMUTH

REMARKS: SEE FIGURE 2 FOR MECHANICAL DETAILS

Figure 1A

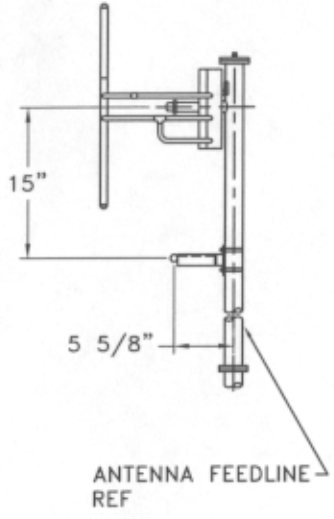
S/O 23321
TABULATION OF HORIZONTAL POLARIZATION
KAYO-FM ELMA, WA

DEGREE	RELATIVE FIELD	DEGREE	RELATIVE FIELD
0	0.295	180	0.910
10	0.325	190	0.920
20	0.390	200	0.945
30	0.530	210	0.990
40	0.660	220	1.000
45	0.730	225	1.000
50	0.800	230	1.000
60	0.930	240	1.000
70	1.000	250	0.970
80	1.000	260	0.825
90	1.000	270	0.630
100	0.980	280	0.460
110	0.935	290	0.405
120	0.920	300	0.390
130	0.950	310	0.375
135	0.960	315	0.365
140	0.960	320	0.355
150	0.960	330	0.330
160	0.940	340	0.310
170	0.930	350	0.300

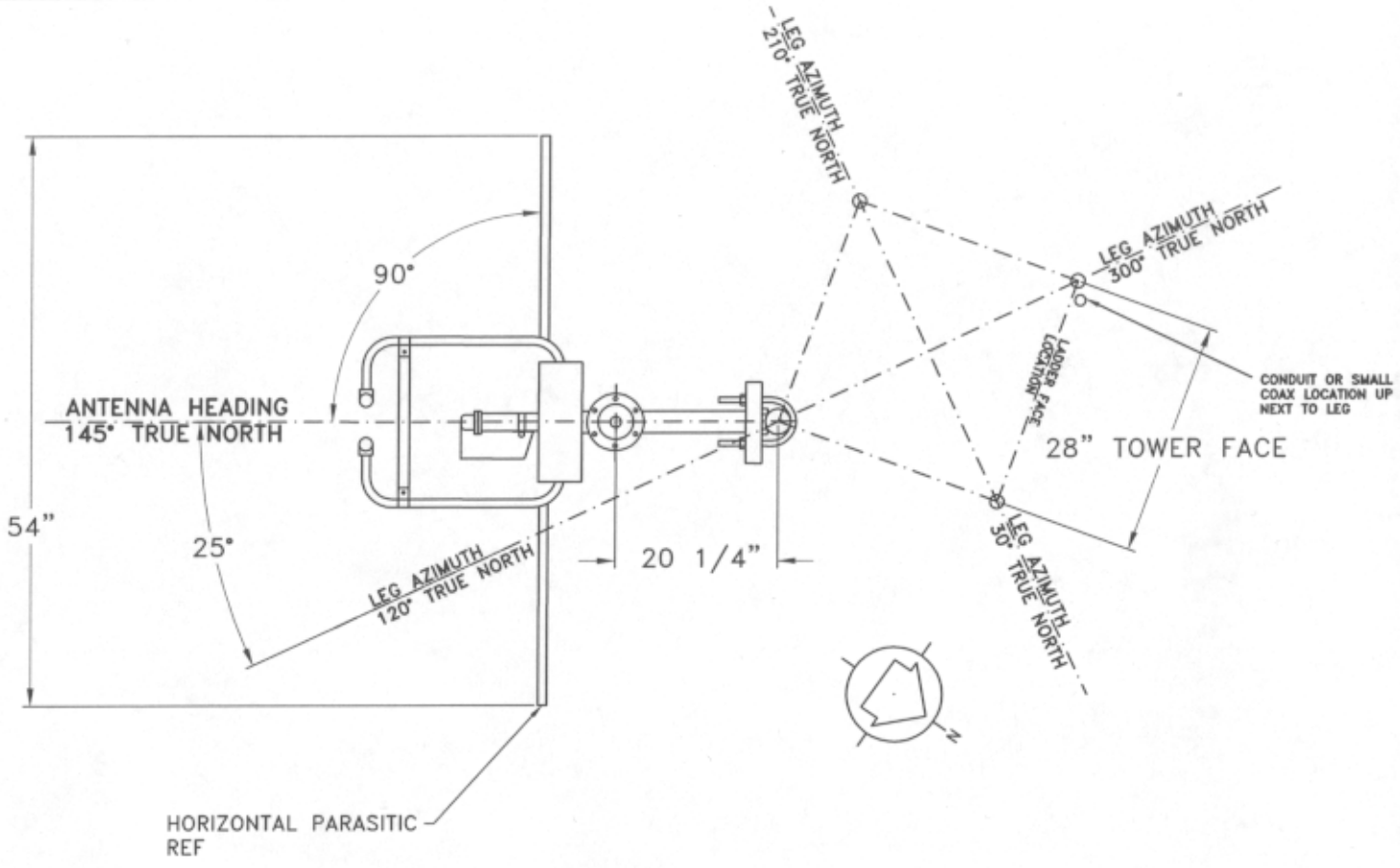
Figure 1B

S/O 23321
TABULATION OF VERTICAL POLARIZATION
KAYO-FM ELMA, WA

DEGREE	RELATIVE FIELD	DEGREE	RELATIVE FIELD
0	0.200	180	0.990
10	0.320	190	0.980
20	0.430	200	0.960
30	0.580	210	0.950
40	0.720	220	0.920
45	0.790	225	0.900
50	0.840	230	0.880
60	0.900	240	0.840
70	0.930	250	0.770
80	0.950	260	0.670
90	0.960	270	0.530
100	0.980	280	0.320
110	0.980	290	0.190
120	0.990	300	0.160
130	0.990	310	0.180
135	0.990	315	0.200
140	0.990	320	0.200
150	0.990	330	0.190
160	0.990	340	0.160
170	0.990	350	0.145



SIDE VIEW



TOP VIEW

TOWER: SELF-SUPPORTING
WITH STRAIGHT TOP SECTION

SHIVELY LABS A DIVISION OF HOWELL LABORATORIES INC.,BRIDGTON, MAINE			
SHOP ORDER: 23321	FREQUENCY: 99.3 MHz.	SCALE: N.T.S.	DRAWN BY: ASP APPROVED BY:
MODEL: 6810-10D-SS-DIRECTIONAL ANTENNA			
DATE: 3/19/04	FIGURE 2		

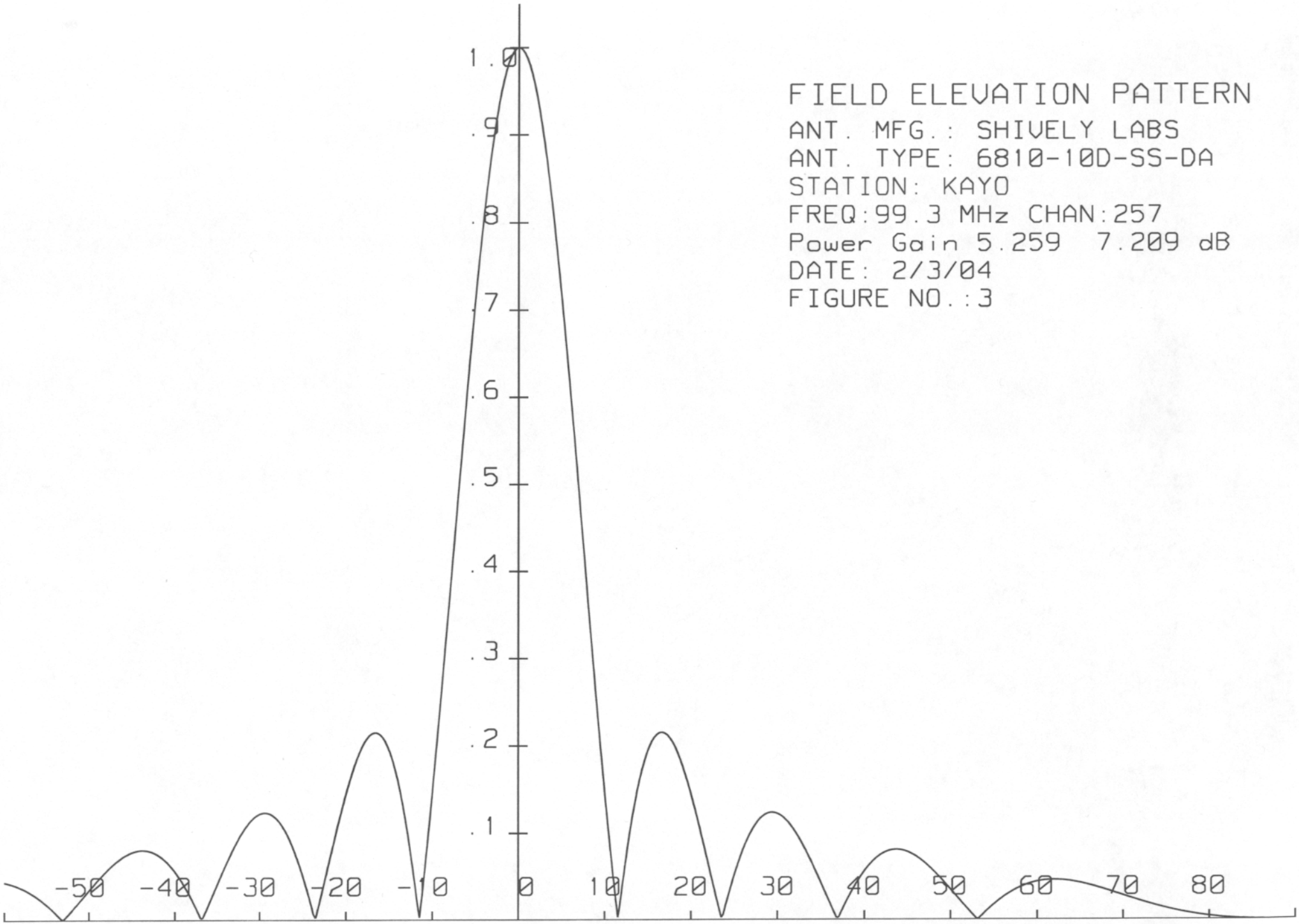

1.0
.9
.8
.7
.6
.5
.4
.3
.2
.1
-50
-40
-30
-20
-10
0
10
20
30
40
50
60
70
80
FIELD ELEVATION PATTERN
ANT. MFG.: SHIVELY LABS
ANT. TYPE: 6810-10D-SS-DA
STATION: KAYO
FREQ:99.3 MHz CHAN:257
Power Gain 5.259 7.209 dB
DATE: 2/3/04
FIGURE NO.:3

FIGURE 4

S.O. 23321

VALIDATION OF GAIN CALCULATION

KAYO-FM ELMA, WA

MODEL 6810-10D-SS-DA

Elevation Gain of 6810-10D-SS-DA equals 3.136

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

Horizontal RMS divided by Vertical RMS equals
$0.780 \div 0.765 = 1.02$

Elevation Gain of Horizontal Component equals
$3.136 \times 1.02 = 3.199$

Elevation Gain of Vertical Component equals
$3.136 \times 0.980 = 3.075$

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

Vertical Azimuth Gain equals $1/(RMS \div Max\ Vert)^2$
$1/(0.765 \div 0.99)^2 = 1.675$

*** Total Horizontal Gain is Elevation Gain times Azimuth Gain**
$3.199 \times 1.644 = 5.259$

*** Total Vertical Gain is Elevation Gain times Azimuth Gain**
$3.075 \times 1.675 = 5.151$

ERP divided by Horizontal Gain equals Antenna Input Power
$41.0\ kW \div 5.259 = 7.796\ kW$

Antenna Input Power times Vertical Gain equals Vertical ERP
$7.796 \times 5.151 = 40.16\ kW$

Maximum Value of the Vertical Component squared times the Maximum ERP equals the Vertical ERP
$(0.99)^2 \times 41\ kW = 40.18\ kW$

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