Shively Labs
a division of Howell Laboratories,Inc.

P. O. Box 389 Harrison Rd.,
Bridgton, Maine 04009 USA

- An Employee-Owned Company -

(207) 647-3327
888-SHIVELY
Fax: (207) 647-8273
E-mail: sales@shively.com
Web site: www.shively.com

S.O. 22993

Report of Test 6600-6R-DA

for

ALC COMMUNICATIONS

KMJY-FM 104.5 MHZ NEWPORT, WA

OBJECTIVE:

The objective of this test was to demonstrate the directional characteristics of a 6600-6R-DA to meet the needs of KMJY-FM and to comply with the requirements of the FCC construction permit, file number BPH-20020429AAY.

RESULTS:

The measured azimuth pattern for the 6600-6R-DA is shown in Figure 1. Figure 1A shows the Tabulation of the Horizontal Polarization. The calculated elevation pattern of the antenna is shown in Figure 3. Construction permit file number BPH-20020429AAY indicates that the Horizontal radiation component shall not exceed 87 kW at any azimuth and is restricted to the following values at the azimuths specified:

310 Degrees T clockwise to 20 Degrees T: 22.0 kW

From Figure 1, the maximum radiation of the Horizontal component occurs at 083 Degrees T to 099 Degrees T and at 235 Degrees T to 265 Degrees T. At the restricted azimuth of 310 Degrees T clockwise to 20 Degrees T the Horizontal component is 6.196 dB down from the maximum of 87 kW, or 20.9 kW.

The R.M.S. of the Horizontal component is 0.790. The total Horizontal power gain is 10.51. See Figure 4 for calculations. The R.M.S. of the FCC composite pattern is 0.88. Therefore this Pattern complies with the FCC requirement of 73.316(c)(2)(ix)(A).

METHOD OF DIRECTIONALIZATION:

One bay of the 6600-6R-DA was mounted on a tower of exact scale to a Stainless 25G. 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-20020429AAY, a single level of the 6600-6R-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.

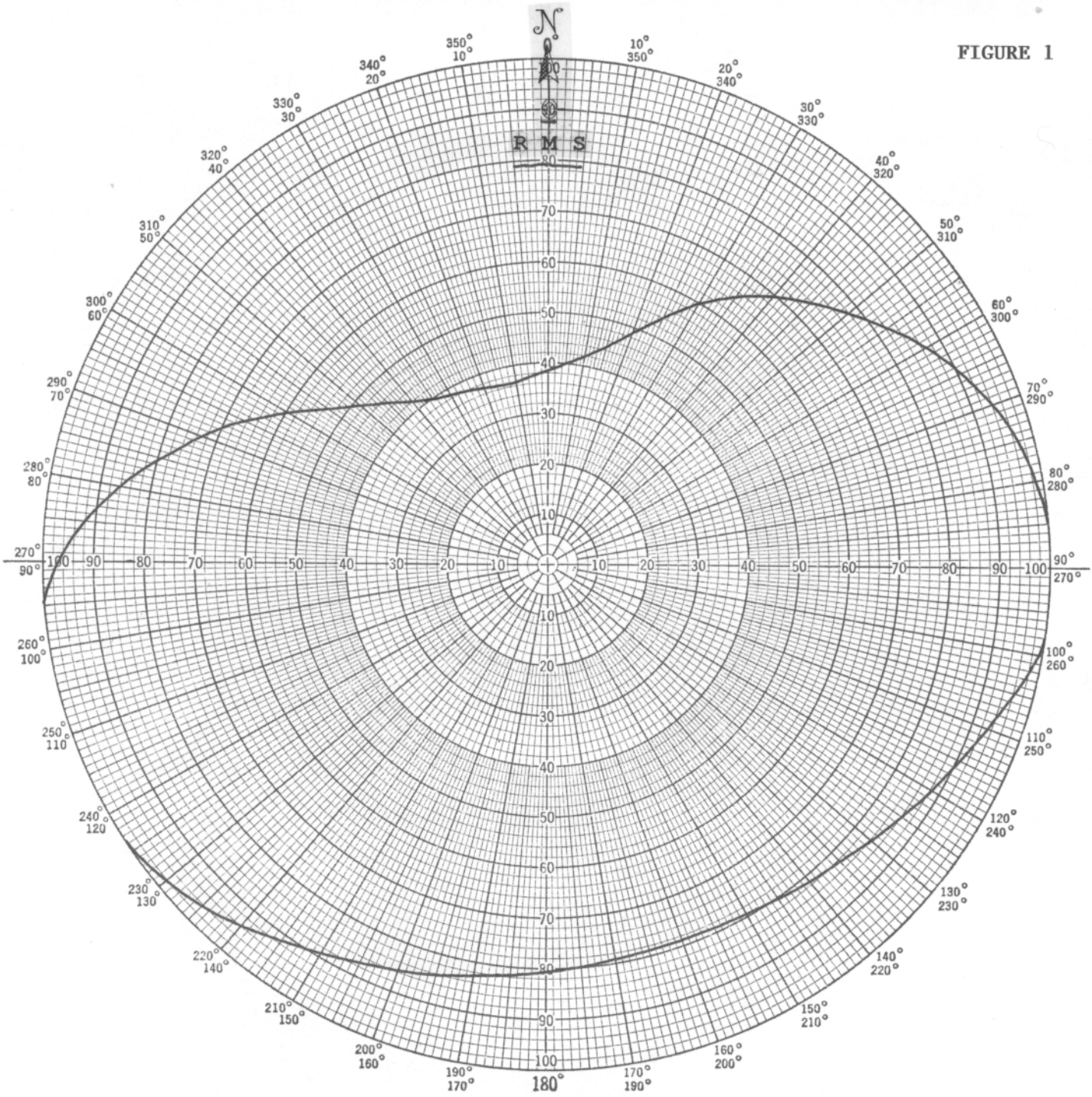
TEST PROCEDURES:

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 470.25 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 22993
June 27, 2003

FIGURE 1



Shively Labs

PROJECT NAME KMJY-FM NEWPORT, WA

PROJECT NUMBER 22993 DATE 6/25/03

MODEL (X) FULL SCALE ( ) FREQUENCY 104.5/470.25 MHz

POLARIZATION HORIZONTAL

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

OBSERVER RAS

ANTENNA TYPE 6600-6R-DA

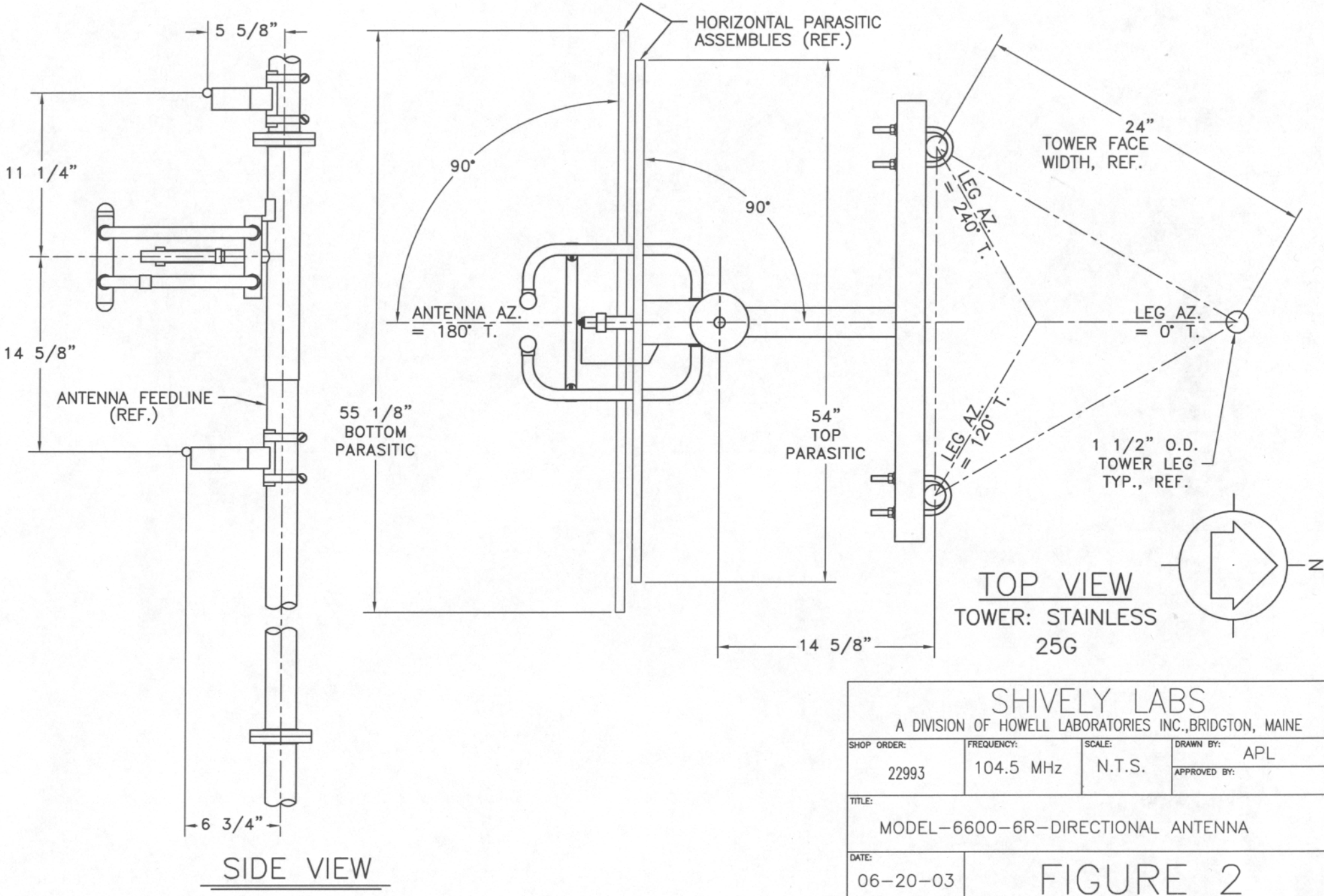
PATTERN TYPE DIRECTIONAL AZIMUTH

REMARKS: SEE FIGURE 2 FOR MECHANICAL DETAILS

Figure 1A

S/O 22993
TABULATION OF HORIZONTAL POLARIZATION
KMJY-FM NEWPORT, WA

DEGREE	RELATIVE FIELD	DEGREE	RELATIVE FIELD
0	0.385	180	0.810
10	0.420	190	0.825
20	0.490	200	0.860
30	0.600	210	0.890
40	0.695	220	0.940
45	0.735	225	0.960
50	0.780	230	0.980
60	0.870	240	1.000
70	0.940	250	1.000
80	0.985	260	1.000
90	1.000	270	0.970
100	0.995	280	0.860
110	0.935	290	0.730
120	0.885	300	0.600
130	0.845	310	0.490
135	0.825	315	0.450
140	0.815	320	0.420
150	0.795	330	0.390
160	0.790	340	0.370
170	0.790	350	0.365



SHIVELY LABS

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SHOP ORDER:	FREQUENCY:	SCALE:	DRAWN BY:
22993	104.5 MHz	N.T.S.	APL
			APPROVED BY:

TITLE: MODEL-6600-6R-DIRECTIONAL ANTENNA

DATE: 06-20-03

FIGURE 2

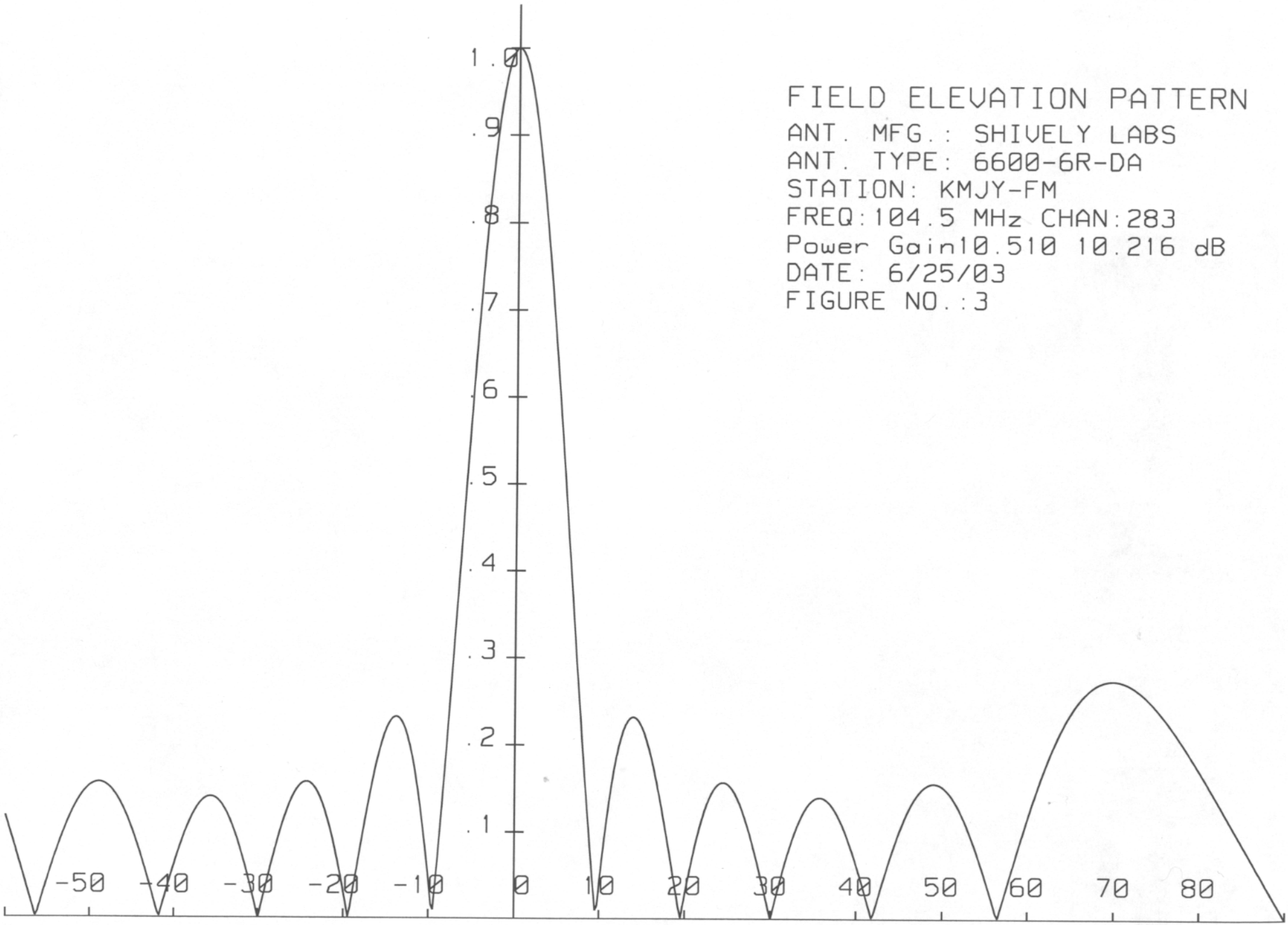
1.0
.9
.8
.7
.6
.5
.4
.3
.2
.1
-50
-40
-30
-20
-10
0
10
20
30
40
50
60
70
80
FIELD ELEVATION PATTERN
ANT. MFG.: SHIVELY LABS
ANT. TYPE: 6600-6R-DA
STATION: KMJY-FM
FREQ:104.5 MHz CHAN:283
Power Gain10.510 10.216 dB
DATE: 6/25/03
FIGURE NO.:3

FIGURE 4

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VALIDATION OF GAIN CALCULATION

KMJY-FM NEWPORT, WA

MODEL 6600-6R-DA

Elevation Gain of 6600-6R-DA equals 6.56

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

Horizontal Azimuth Gain equals $1/(RMS)^2$
$1/(0.79)^2 = 1.602$

*** Total Horizontal Gain is Elevation Gain times Azimuth Gain**
6.56 x 1.602 = 10.51

ERP divided by Horizontal Gain equals Antenna Input Power
87.0 kW ÷ 10.51 = 8.28 kW